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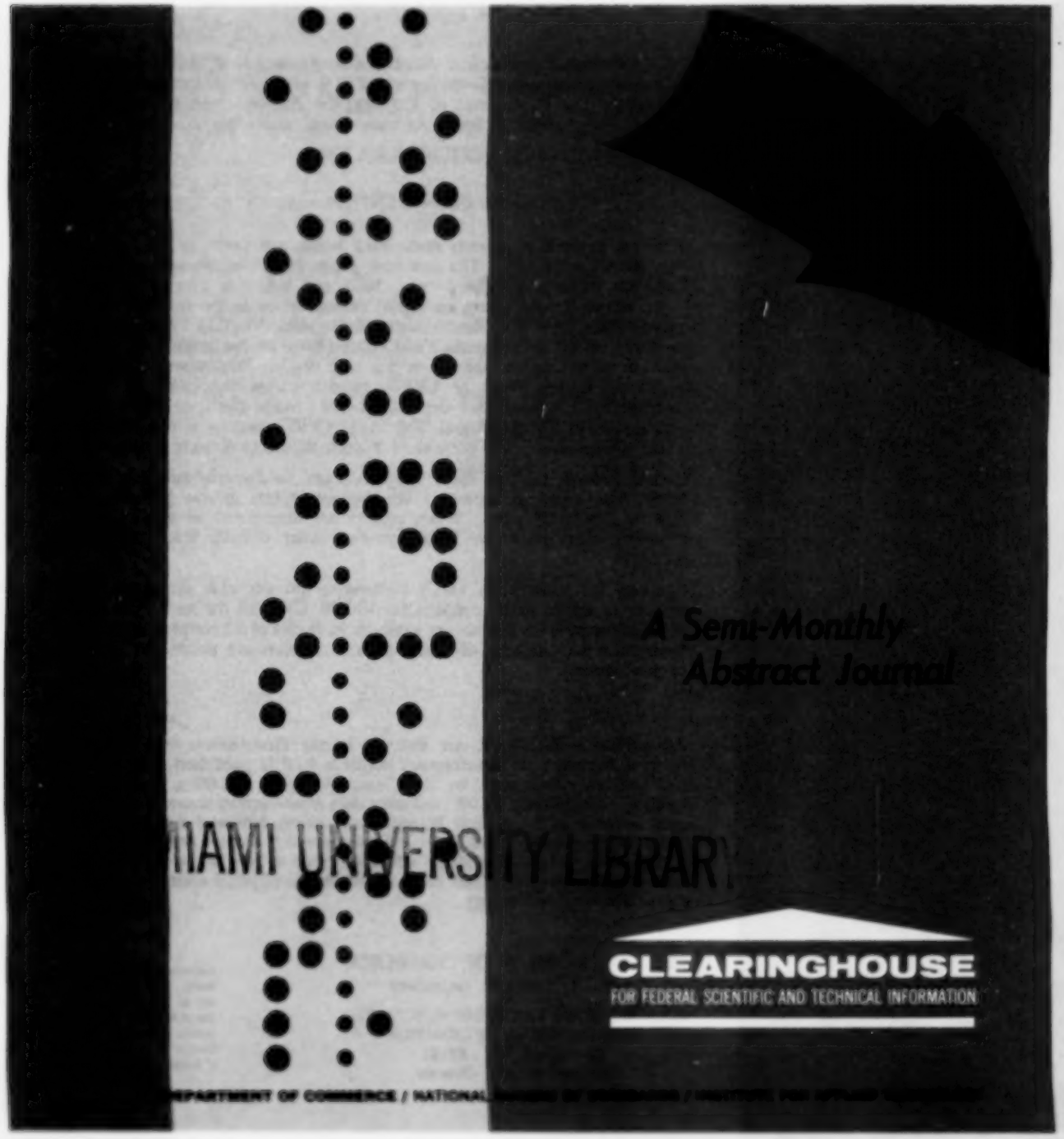
U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

February 10, 1967



U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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PURPOSE

U.S. Government Research & Development Reports (USGRDR) announces the availability of selected new reports of U.S. Government-sponsored R & D released by the Department of Defense, the Atomic Energy Commission, National Aeronautics & Space Administration, and other agencies.

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Certain reports, such as those available from the Superintendent of Documents, are priced as shown in the announcements in this journal rather than at the $3.00 price. When reports are announced as available from a source other than the Clearinghouse, order directly from the source indicated.

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INDEX

All entries in USGRDR are indexed in the *Government-Wide Index to Federal Research & Development Reports (GWI)* published semi-monthly and sold on subscription by the Clearinghouse at $22.00 a year ($27.50 foreign). Single copy $3.00. Indexing data from current issues of announcement journals of the Atomic Energy Commission, National Aeronautics and Space Administration, and Defense Documentation Center are also included in this index to provide a single reference guide to new unclassified Government-sponsored research and development in the physical sciences, engineering, and related technology.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated. Use of funds for this publication approved by the Director of the Bureau of Budget, June 22, 1966.

THE

CLEARINGHOUSE

ANNOUNCES

NEW PRICE POLICY

Described on page ii.

CHANGES IN USGRDR JOURNAL FORMAT

Described on page iii.

UNIT PRICE POLICY

Effective January 1, 1967 the Clearinghouse changed its pricing policy for document sales from a sliding price scale based on document size to a single price for documents sold. The new document price for a paper copy (hard copy - HC) is $3.00. The new price for a microfiche (MF) copy is $.65 per document. These prices also apply to documents announced prior to January 1, 1967. The single price does not apply to multiple copy orders of a single document. Quotations on quantity purchases of a single title are available on request. The new unit prices are below the previous average prices of documents sold by the Clearinghouse. Efficiencies in order processing resulting from the single price policy make the lower average price possible.

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JOURNAL FORMAT CHANGES

This issue of USGRDR contains some significant format changes and innovations which should make the journal much easier to use.

The basic format of each entry in the journal has been changed to facilitate rapid scanning of reports by title. The title appears in bold face at the beginning of each document entry. Ordering information, accession number and price, appear at the end of each entry. This format change should make it easier to locate reports of interest to readers.

Cross reference entries have been expanded to include document title, document price and corporate author information. In the previous format, cross references were indicated by document number only and the user had to refer to the primary field and group to find the document title. This change was also made to facilitate the scanning of the entries in a given field and group.

For AEC and NASA reports which are announced in USGRDR without abstracts, the entry refers to the source journal, SCIENTIFIC AND TECHNICAL AEROSPACE REPORT or NUCLEAR SCIENCE ABSTRACTS, where the abstract of the entry may be found. This will permit those users who have access to these journals to review the document abstract although it is not available in USGRDR.

An edge index to the contents of USGRDR has been printed on the back cover of the journal with index marks on the appropriate pages to permit the user to readily locate a specific COSATI field.

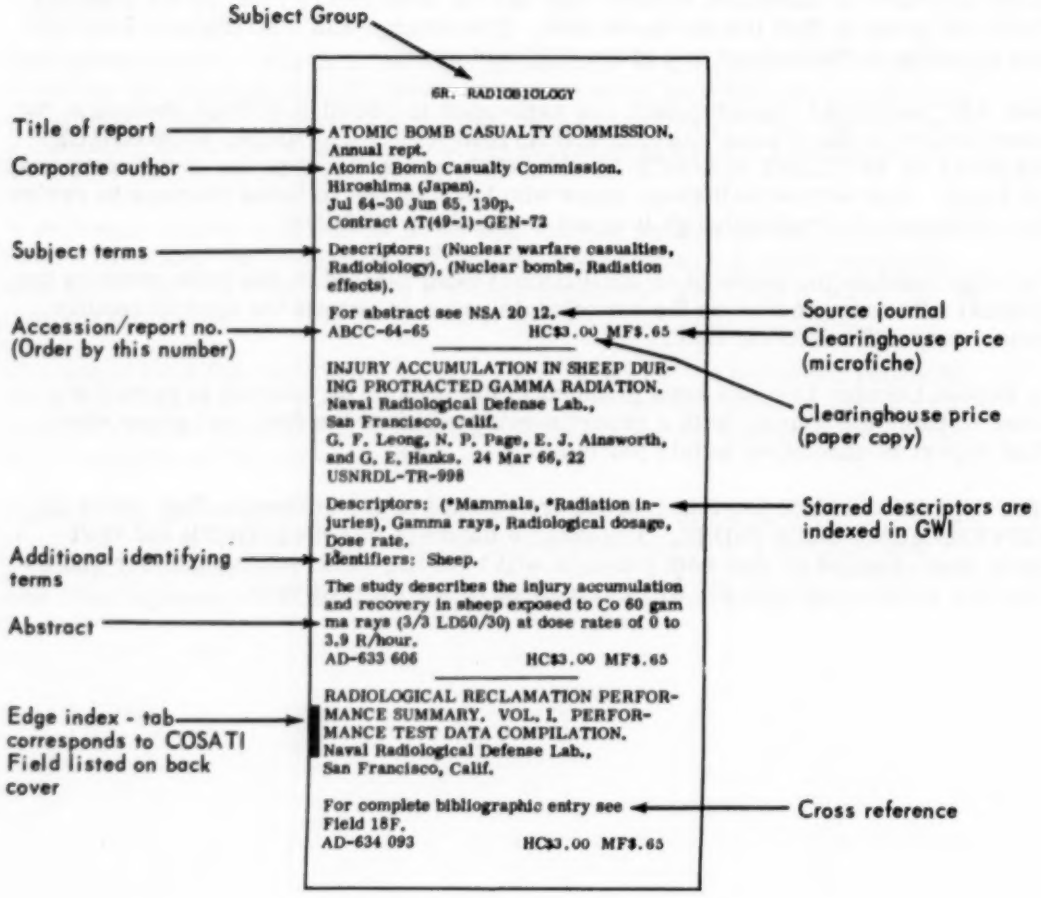
A Report Locator List has been included in the back of the journal to permit the user to enter the journal with a report number and find the field and group where that report is announced in this journal.

The reports announced in this journal are indexed in the corresponding issue of GOVERNMENT-WIDE INDEX. The volume numbers of both USGRDR and GWI have been changed so that both journals will have the same volume number and so that the volume number, 67, will correspond to the current year.

USGRDR FORMAT

Reports are announced under 22 subject categories called FIELDS. Each FIELD is divided into subcategories called GROUPS. Documents are listed alphanumerically by accession number within the GROUP. This classification system was adopted by the Committee on Scientific and Technical Information (COSATI) of the Federal Council on Science and Technology. The *COSATI Subject Category List* (AD–621 200) is available from the Clearinghouse at $3.00.

SAMPLE JOURNAL ENTRIES


Subject Group
6R. RADIOBIOLOGY
Title of report
ATOMIC BOMB CASUALTY COMMISSION. Annual rept.
Corporate author
Atomic Bomb Casualty Commission, Hiroshima (Japan).
Jul 64-30 Jun 65, 130p.
Contract AT(49-1)-GEN-72
Subject terms
Descriptors: (Nuclear warfare casualties, Radiobiology), (Nuclear bombs, Radiation effects).
For abstract see NSA 20 12.
Source journal
Accession/report no. (Order by this number)
ABCC-64-65 HC$3.00 MF$.65
Clearinghouse price (microfiche)
INJURY ACCUMULATION IN SHEEP DURING PROTRACTED GAMMA RADIATION.
Naval Radiological Defense Lab., San Francisco, Calif.
G. F. Leong, N. P. Page, E. J. Ainsworth, and G. E. Hanks. 24 Mar 66, 22
USNRDL-TR-998
Clearinghouse price (paper copy)
Descriptors: (*Mammals, *Radiation injuries), Gamma rays, Radiological dosage, Dose rate.
Starred descriptors are indexed in GWI
Additional identifying terms
Identifiers: Sheep.
The study describes the injury accumulation and recovery in sheep exposed to Co 60 gamma rays (3/3 LD50/30) at dose rates of 0 to 3.9 R/hour.
Abstract
AD-633 606 HC$3.00 MF$.65
RADIOLOGICAL RECLAMATION PERFORMANCE SUMMARY. VOL. I. PERFORMANCE TEST DATA COMPILATION.
Naval Radiological Defense Lab., San Francisco, Calif.
Edge index - tab corresponds to COSATI Field listed on back cover
For complete bibliographic entry see Field 18F.
Cross reference
AD-634 093 HC$3.00 MF$.65

FOREWORD

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS is produced by computer from machineable records generated by four Federal agencies which announce R&D reports. Machineable records from the Atomic Energy Commission, the National Aeronautics and Space Administration, the Defense Documentation Center and the Clearinghouse for Federal Scientific and Technical Information are merged to produce USGRDR. All of the reports announced in USGRDR are indexed in the companion index, GOVERNMENT-WIDE INDEX TO FEDERAL RESEARCH & DEVELOPMENT REPORTS.

There are some format errors and inconsistencies in this journal resulting from the machine merger of the data generated by several agencies. Efforts are being made to correct these inconsistencies. The agencies involved are working with a task group of the Committee on Scientific and Technical Information to develop improved interagency standards which will eliminate these problems.

The Clearinghouse is striving to improve the content and format of USGRDR so that it will become increasingly valuable to the general public as an announcement tool and order guide. Comments and suggestions for improvement are invited and should be directed to the Director, Clearinghouse, Springfield, Va. 22151.

CONTENTS

Page

RESEARCH HIGHLIGHTS..... ix

RESEARCH & DEVELOPMENT REPORTS..... 1

SUBJECT CATEGORY HEADINGS

Use Edge Index on back cover to locate COSATI Field in journal

COSATI FIELD

01 AERONAUTICS

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE

Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY

Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive)

Includes conversion techniques; power sources; and energy storage.

COSATI FIELD

11 MATERIALS

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear powerplants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS

Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

Categories

	Page
Coatings	ix
Mathematics	x
Space Technology	x
Control Systems and Instrumentation	xi
Marine Technology	xi
Transportation (Land, Sea, Air, Space)	xi
Electronic	xii
Food Processing	xiii
Information Technology	xiii
Optics	xiii
Nuclear Technology	xiv
Social Sciences and Education	xiv
Wood and Paper	xv
Management Control, Decision Systems	xv

Coatings

PROTECTIVE LINING SYSTEMS FOR PIPING FOR FRESH-WATER IMMERSION, tested for exposure and erosion by the Bureau of Reclamation, showed a high percentage of satisfactory performance. Of the 36 field systems applied to siphon piping on the Collbran Project, Colorado, 25 showed a defect-free condition (Class A) after four years exposure, while only 1 showed failing condition (Class D). Erosion resistance rating placed 15 systems in Class A and 2 in Class D. Companion coating systems laboratory tested in fresh-water immersion for 5 years rated 21 in Class A, while none failed completely. Coatings tested included many 2-component materials and several zinc or zinc-containing linings. The remainder of the project piping was coated with a standard coal-tar enamel, which showed excellent condition. . . . . ORDER PB-173 626 -- FOURTH-YEAR LABORATORY AND FIELD INSPECTION OF EXPERIMENTAL PROTECTIVE LININGS SOUTHSIDE CANAL-COLLBRAN PROJECT, COLORADO, price $3.00 (microfiche 65 cents). . . . . Chemical Engineering Branch, Office of the Chief Engineer (ChE-58), Bureau of Reclamation, Denver, Colo., June 1966, 85 pages.

Mathematics

THE QUADRATIC CONTROL REGULATOR problem with an energy constraint has been investigated from the viewpoint of having limited control energy available, or as an indirect method of limiting the maximum control amplitude. Three specific cases were examined in the numerical evaluation -- namely, the harmonic oscillator ($\ddot{x} + x = \mu$), the single integrator with damping ($\ddot{x} + \dot{x} = \mu$), and the double integrator ($\ddot{x} = \mu$). The numerical results indicated that constraining control energy did tend to constrain maximum control amplitude. . . . . ORDER AD-643 495 -- QUADRATIC CONTROL PROBLEM WITH AN ENERGY CONSTRAINT: APPROXIMATE SOLUTIONS, price $3.00 (microfiche 65 cents). . . . . G. Cook and J. Funk, Frank J. Seiler Research Laboratory for the Air Force, Oct. 1966, 31 pages.

THE PROBLEM OF MAKING INFERENCES about the parameters in the three-component hierarchical random effect model has been considered from a Bayesian point of view. Results have been related to the traditional sampling theory results and their difficulties. Various features of the posterior distributions of the variances of the random effects and the error variance are discussed. These include the ratio of the mean square of the nested component to the error variance, the relative contributions of the three variance components to the total variance of the observations, and the magnitude of the individual variance components. The Bayesian solution to the problem of the pooled estimate of the error variance is given for the two-component and three-component models. Also, an approximation technique is developed for the marginal distributions for the variance components and is generalized to the q-component hierarchical model. . . . .ORDER PB-173 525 -- BAYESIAN ANALYSIS OF A THREE COMPONENT HIERARCHICAL DESIGN MODEL, price $3.00 (microfiche 65 cents). . . . .A new report by G. E. P. Box and G. C. Tiao, The University of Wisconsin, Madison, Wisc., supported in part by National Science Foundation, Aug. 1966, 35 pages.

Space Technology

SURFACE WIND ANALYSES AND CYCLONE TRACK CHARTS of the tropical central Atlantic Region have been made for the period October 1 to November 10, 1963, by the Department of Meteorology of Florida State University as part of a continuing study of satellite weather data and conventional data. A comparison with mosaics and nephranalyses of the TIROS VI and TIROS VII passes for the period added no new information from the satellites concerning cyclones. Analysis of the October 1963 charts reveal that the idea of steering of individual surface cyclones with a low-level basic current in which they are embedded is an oversimplification; the wave to vortex development sometimes leading to storms did not appear in the region; none of the cyclones during the period had troughs extending northward; and the easterly wave phenomenon was completely absent from the synoptic charts. These results leave the question as to how and why preexisting cyclones, apparently in a state of weakening as they move to the WSW in the Central Atlantic, sometimes intensify into tropical storms or hurricanes. . . . . ORDER PB-173 683 -- SATELLITE STUDY, TROPICAL NORTH ATLANTIC, 1963, PART I, SURFACE WIND ANALYSES, OCTOBER 1 - NOVEMBER 10, price $3.00 (microfiche 65 cents). . . . . C. I. Aspliden et al., Florida State University (Report No. 66-5) for ESSA, Oct. 1966, 112 pages.

Control Systems and Instrumentation

MICROELECTRODE AND MACROELECTRODE EXPERIMENTS WITH RATS, CATS AND MONKEYS constitute a continuing study by the Edsel B. Ford Institute for Medical Research. Scientists of the Institute inserted laboratory-developed electrodes into portions of the brains of the animals, administered stimuli and recorded EEG and AKG. The microelectrode observations in rats and cats suggested this discharge is not a neural membrane phenomenon. In three monkeys repeated stimulation and recording from macroelectrodes revealed that the most reliable stimuli were 80% duty cycle "square wave" impulses with a frequency of 400 cps and voltages ranging from 6-15 volts with current flow of approximately 3.0 milliamperes for 10 seconds. Discharges produced were 3 cps, lasting up to three days, and in some cases, there were large fluctuating DC shifts in the cortex and/or amygdala areas. . . . . ORDER AD-643 511 -- DYNAMICS OF RETICULAR AND LIMBIC POST STIMULUS DISCHARGE, price $3.00 (microfiche 65 cents). . . . . L. D. Proctor et al., Edsel B. Ford Institute for Medical Research, Detroit, Mich., for the Air Force (AFOSR-66-2807), Nov. 1966, 19 pages.

Marine Technology

A CONTINUING INVESTIGATION OF THE THERMAL STRUCTURE and circulation of Lake Superior by a research team of the University of Wisconsin is reported by the Office of Naval Research jointly with the U. S. Department of Interior. A series of four closely spaced airborne temperature surveys, employing the infrared radiometer, were made during the latter part of July 1964. The surveys showed the existence and short-term persistence of "cold pools" or regions of cold surface water in the central parts of the east and west basins of Lake Superior. It was indicated that they could only be maintained by a general upward motion of cold water in those areas. Additionally, a steep horizontal temperature gradient directed normal to the coast was found along the north side of the Keweenaw Penninsula. The study had a twofold purpose: to determine if the "cold pools" were a regular characteristic of the summer pattern of Lake Superior, and if so when they formed; and, to investigate in more detail the surface temperature pattern and its relation to the sub-surface thermal structure in the region along the north side of the Keweenaw Penninsula. . . . . ORDER AD-642 020 -- THE KEWEENAW CURRENT, A REGULAR FEATURE OF SUMMER CIRCULATION OF LAKE SUPERIOR, price $3.00 (microfiche 65 cents). . . . . R. A. Ragotzkie, Department of Meteorology, University of Wisconsin, Madison, Wisc., for the U. S. Navy and U. S. Department of Interior, Aug. 1966, 40 pages.

Transportation (Land, Sea, Air, Space)

COMPREHENSIVE IMPROVEMENT OF PUBLIC TRANSPORT could effectively divert riders from the private vehicle, thus reducing street congestion and its attendant problems in corridors of high demand, according to a study by Wilbur Smith and Associates. The study has undertaken to define the market for urban travel in five middle-sized urban areas and to relate this to the characteristics of urban populations and the quality of transportation services now provided by public or pri-

vate forms of transport. The study undertakes to quantify some values such as characteristics of the operation of modes of transport, needs and desires of trip makers, cost of transport, and intangible values such as comfort, safety, and aesthetics. The investigation explores the potentiality of the bus to accommodate a major share of the travel in critical corridors and the relief this would afford to current conditions. Its alternative implications are construction of new facilities and development of a new transport medium which would require less of the present capacity. Data collected is summarized and analyzed in one volume, while tabulations and figures are included in a supplementary volume. . . . . ORDER PB-173 665 -- EVALUATION OF BUS TRANSIT DEMAND IN MIDDLE SIZED URBAN AREAS, FINAL REPORT--FIRST PHASE, price $3.00 (microfiche 65 cents). . . . . Wilbur Smith and Associates, New Haven, Conn., for the Bureau of Public Roads, 1966, 308 pages. Volume II is available as PB-173 666 -- Same Title, Volume II--Appendix, price $3.00 (microfiche 65 cents), 1966, 187 pages.

Electronics

DEVELOPMENT OF A FAMILY OF COMPLETELY ELECTRONIC SOLID STATE DISPLAYS capable of effectively presenting flight control information is not only feasible but forseeable in the near future, according to the Air Force Flight Dynamics Laboratory. The most important result of the research, whose requirements are determined by a pilot's basic range of perceptual sensitivity and by operational needs, has been a breakthrough in display filtering techniques which has permitted the fabrication of displays reflecting 2% of all incident light and transmitting 35% of all emitted light. Combining this capability with that of high intensity sulfo-selenide electroluminescent phosphors, the laboratory has fabricated and flight-tested solid state displays clearly visible under bright ambient conditions. According to Laboratory scientists, the advantages of solid state over other electronic generation techniques can be measured in terms of digital control, improved reliability, automatic scale factor variability, minimized display weight, reduced size and power requirements, and reduction of display cost. . . . . ORDER AD-643 530 -- SOLID STATE DISPLAY TECHNIQUES, price $3.00 (microfiche 65 cents). . . . . C. J. Peterson, Air Force Flight Dynamics Laboratory (AFFDL-TR-66-123), Wright-Patterson AFB, Ohio, Oct. 1966, 40 pages.

TO IMPROVE THE SENSITIVITY OF INDUCTORLESS FILTERS, design should involve active RC filters using gyrators rather than a smaller, lighter-weight RC-NIC circuit or the conventional RLC circuit, according to a study by personnel of Stanford Electronics Laboratory. The fact that NIC circuit design technique "subtracts" large element values of the circuit to obtain small effective values, thus increasing their sensitivity to parameter changes in the active element, limits the applications of this circuit when circuit sensitivity is desired. Conventional RLC filters have relatively small sensitivity in the passband, and replacement of inductors with gyrator-capacitor does not change this sensitivity to a significant degree. According to the researchers, this result should have considerable importance for integrated circuits where adjustable gyrators appear readily available. . . . . ORDER PB-173 664 -- ON THE SENSITIVITY IMPROVEMENT OF INDUCTORLESS FILTERS, price $3.00 (microfiche 65 cents). . . . . J. Woodard and R. W. Newcomb, Stanford Electronics Laboratory (SU-SEL-66-061), Stanford, Calif., for National Science Foundation, Aug. 1966, 10 pages.

Food Processing

GRASSES, GRASSLIKE PLANTS, FORBS, AND SHRUBS inhabiting the longleaf pine-bluestem range are abundant and generally suitable for cattle and wildlife grazing, according to a handbook prepared by the Southern Forest Experiment Station. The publication identifies and describes in detail the vegetation found according to species, assesses its value as food, and indicates its geographical range. Line drawings show salient taxonomic features of the various species. In spite of the presence of some noxious weeds and some species with little nutritive value, the grazing capacity of these ranges is high, provided there is regular control-burning and moderate cattle foraging. The range is also excellent habitat for bobwhite quail, mourning doves, wild turkey, and whitetail deer. . . . . ORDER PB-173 634 -- COMMON PLANTS OF LONGLEAF PINE-BLUESTEM RANGE, price $3.00 (microfiche 65 cents). . . . . H. E. Grelen and V. L. Duvall, Southern Forest Experiment Station (U. S. Forest Service Research Paper SO-23), New Orleans, La., 1966, 100 pages.

Information Technology

DEVELOPMENTS IN COMPUTATIONAL LINGUISTICS at the Computation Laboratory of Harvard University are described in a collection of papers. The papers fall into four main categories: linguistics, mathematical models of language, parsing, and application of linguistics to computer problems. Linguistics papers discuss stative adjectives and verbs, verb phrase constituency, negation, tree-structure pruning, relativization in extraposed clauses, phrasal conjunction and symmetric predicates, past tense replacement and the modal system. Mathematical models of language papers include discussion of ordered phrase structure grammars, composition of right and left sequential machines. Parsing includes papers on a procedure for arbitrary context-free grammars and the upperbound of recognition time, and on the immediate constituent analyzer. The paper on application of linguistics to computer problems is a semantic interpretation of English questions on a structured data base. . . . . ORDER PB-173 630 -- MATHEMATICAL LINGUISTICS AND AUTOMATIC TRANSLATION, price $3.00 (microfiche 65 cents). . . . . A. G. Oettinger et al., The Computation Laboratory, Harvard University, Cambridge, Mass., for the National Science Foundation (NSF-17), Aug. 1966, 294 pages.

Optics

PLASMA PRODUCED BY A Q-SWITCHED LASER BEAM focused on the surface of a metallic solid has been studied by scientists at the Naval Ordnance Laboratory to obtain time-resolved and time-integrated measurements. Photographic, spectroscopic and charged particle emission data were taken on a nanosecond basis using a one megawatt peak power Nd laser. Experimental results indicate a plume velocity of 2.5 cm per microsecond, a plasma temperature of 40,000°K and an electron density of $5 \times 10^{17} cm^{-3}$. High speed photographs show that a laser beam penetrates a thin metallic foil in about 6 nanoseconds. No evidence of recoil pressure buildups on either side of the foil is evident. . . . . ORDER AD-643 509 -- TIME RESOLVED STUDIES OF LASER-INDUCED PLUMES FROM SOLIDS, price $3.00 (microfiche 65 cents). . . . . B. V. Kessler and C. E. Bell, Naval Ordance Laboratory (NOLTR 66-96), White Oak, Md., report received Dec. 1966, 30 pages.

Nuclear Technology

PLUTONIUM-238 DOES NOT SHOW NEUTRON MULTIPLICATION in water and only slight multiplication in air, according to an experiment performed by scientists of Monsanto Research Corporation in an attempt to establish the nuclear safety of the isotope. 21 steel storage capsules containing 80 grams each of plutonium-238 were assembled in a heterogeneous array. Measurements were made independently in a water and in an air medium. The experimenters warn that the data reported should be used with caution due to several systematic errors: self-shielding effect of the capsules, geometrical effect between the detector and capsules, detector response, and scattering and absorption properties of the steel capsules. . . . . ORDER MLM-1340 -- NEUTRON MULTIPLICATION DETERMINATION OF PLUTONIUM-238 DIOXIDE, price $3.00 (microfiche 65 cents). . . . . R. A. Wolfe and J. B. Kahle, Monsanto Research Corp., Mound Laboratory, Miamisburg, Ohio, for the AEC, report received Nov. 1966, 24 pages.

Social Sciences and Education

TRAINING OF PILOTS IN OPERATIONAL FLIGHT TRAINERS (OFT) can increase the proficiency of students, aid in training pilots to deal with emergencies, and aid in student's transition from one aircraft to another, according to an experimental study for the Navy by the Psychological Corporation. The findings are based on a series of controlled flight training experiments using matched pairs of students receiving multi-engine training. Although the study shows that OFT training does not appreciably reduce actual flight training time, the experimenters felt that further research is necessary to determine a flight time factor. In considering possible design changes in the OFTs, the experimenters concluded that the purposes of the trainers be reconsidered: the proficiency, emergency, and transition factors be given equal consideration with that of teaching new skills more rapidly, and that these purposes be adapted to requirements of a student or an expert pilot. . . . . ORDER AD-643 499 -- PSYCHOLOGICAL STUDIES OF ADVANCED NAVAL AIR TRAINING: EVALUATION OF OPERATIONAL FLIGHT TRAINERS, price $3.00 (microfiche 65 cents). . . . . W. R. Mahler et al., The Psychological Corporation, New York, for the Navy Special Devices Center (SDC 999-1-1), report received Dec. 1966, 156 pages.

IN REVIEWING "SOVIET STRATEGIES IN SOUTHEAST ASIA," a 1966 book by Charles B. McLane of Dartmouth College, T. W. Robinson of the RAND Corporation points out that McLane surveys the history of Soviet Southeast Asian policy from Lenin through the death of Stalin, matching Soviet policy turns with changes in the local picture of the indigenous parties. According to Robinson, two conclusions may be drawn from McLane's work: first, that Soviet policy in Asia stood distinctly second to policy in Europe; and second, a more integrated local system developed since Soviet guidance was absent for long periods of time when local parties had to depend on substitutes. Robinson feels that McLane overstated the dependence of Asian parties on the Soviet Union, that the influence of local conditions increased as dependence on Moscow decreased over the period. This is a lucid review of a significant new book. . . . . ORDER AD-643 496 -- REVIEW OF SOVIET STRATEGIES IN SOUTHEAST ASIA: AN EXPLORATION OF EASTERN POLICY UNDER LENIN AND STALIN, price $3.00 (microfiche 65 cents). . . . . T. W. Robinson, RAND Corp. (P-3488), Santa Monica, Calif., Nov. 1966, 5 pages.

Wood and Paper

PULPWOOD PRODUCTION IN THE SOUTH established a record high of 30,790,800 cords in 1965, 63% of the nation's total, according to a cooperative annual report by the Southeastern Forest Experiment Station, the Southern Forest Experiment Station and the Southern Pulpwood Conservation Association. At the year's end, there were 82 pulpmills in operation in the South; their pulping capacities exceeded 59,000 tons per day. Nine mills located outside the region drew wood from the South in 1965. Statistics bearing out these figures and comparing production with 1964 are given in tabular form by state, county, mill, and by type of wood. . . . . ORDER PB-173 659 -- SOUTHERN PULPWOOD PRODUCTION, 1965, price $3.00 (microfiche 65 cents). . . . . R. L. Welch, Southeastern Forest Experiment Station, Asheville, N. C., Southern Forest Experiment Station, New Orleans, La., and Southern Pulpwood Conservation Association, Atlanta, Ga., 1966, 28 pages.

THE CHARRING RATES OF WOOD UNDER FIRE EXPOSURE and the effect of temperature, species, density, moisture content, and grain direction on these rates are currently being studied by the Forest Products Laboratory as a future basis for designing and predicting fire endurance of wood assemblies. This preliminary review of the literature indicates that prolific experiments and proposed models of the charring rate in other polymers can provide a good foundation for wood char analysis, for which information is largely empirical in nature. A comparison of the limited models developed for charring rates of wood and other polymers suggests that the principle of conservation of mass, coupled with Arrhenius-type temperature dependence, may be appropriate in the physical description of the charring of wood. The review summarizes information on the mechanisms of thermal degradation of wood, properties affecting rate of char, models and measured rates of char development, and heat liberation during combustion. . . . . ORDER PB-173 629 -- REVIEW OF INFORMATION RELATED TO THE CHARRING RATE OF WOOD, price $3.00 (microfiche 65 cents). . . . . Forest Products Laboratory (FPL-0145), Madison, Wis., Nov. 1966, 65 pages.

Management Control, Decision Systems

A SYSTEM FOR EVALUATION OF NAVY JOBS has been under consideration by the Navy Personnel Research Laboratory. The Laboratory considered four conventional systems of job evaluation for adaptation to special needs. Three of the systems proved to be inadequate for Navy requirements: job ranking cannot determine relative value of jobs; the classification system involves cumbersome standards which would have to be preestablished; factor comparison is a complicated process based on selected bench mark jobs, subject to frequent change in the Navy. The point rating system was judged suitable for adaptation because of its flexibility, objectivity, consistency, validity, and ease of understanding. Objective and measurable entities are factors which can be weighted accurately. This system also meets the criteria of being economically feasible, acceptable to upper management levels, and useful in related management processes such as training, manpower planning, and job re-engineering. . . . . ORDER AD-643 508 -- JOB EVALUATION: SELECTING THE TYPE OF SYSTEM FOR NAVY USE, price $3.00 (microfiche 65 cents). . . . . A. J. Rose, Personnel Research Laboratory (WRM 67-7), Washington, D. C., Nov. 1966, 25 pages.

THE CRITICAL PATH METHOD, one of a number of techniques that have been developed to aid management in project organization and control, has been applied to Interstate Highway construction projects with outstanding success, according to studies done for the Bureau of Public Roads. Numerous highway departments and contractors have reported widespread savings of time and money through use of the method, described as a tool for defining, integrating, and monitoring a program in order to accomplish all objectives in a given time. The method indicates which activities have to be completed before others can begin, clearly revealing the overall effects of delay in any particular activity. The method involves development of a project network model, after which,time estimates are assigned for all activities. The one continuous path of activities through the network that determines the duration of the total project is the critical path. Only by expediting activities on the critical path can the total project duration time be shortened. The method is extremely flexible in that it permits an activity to be shown grossly as well as being illustrated to the finest degree desired. The first two reports listed are parts of a two-volume set on applying the method to state highway programming. The first volume deals with the system definition, methodology and procedures, and the second comprises the computer programs for performing analyses and computations involved in developing and updating highway program schedules and monitoring their progress. The third report is a manual which provides the fundamentals of the technique; its specific application to highway programs; and its application to multiple programs, including the determination of manpower, equipment and funding requirements. Also considered are presentation of a CPM computer system. The manual is illustrated and edited with the sub-professional in mind as well as the professional. . . . . price $3.00 each (microfiche 65 cents).

PB-173 560 -- APPLICATION OF THE CRITICAL PATH METHOD OF MANAGEMENT CONTROL TO STATE HIGHWAY PROGRAMMING, VOL. I, E. S. Preston and Associates, Ltd., for Office of Research and Development, Bureau of Public Roads, Washington, D. C., Sept. 1964, 148 pages.

PB-173 561 -- SAME TITLE, VOL. II, 226 pages.

PB-173 562 -- A MANUAL FOR APPLYING THE CRITICAL PATH METHOD TO HIGHWAY DEPARTMENT ENGINEERING AND ADMINISTRATION, E. S. Preston and Associates, Ltd., for Office of Research and Development, Bureau of Public Roads, Washington, D. C., Nov. 1963, 226 pages.

RESEARCH & DEVELOPMENT REPORTS

1. AERONAUTICS

1A. AERODYNAMICS

A SUMMARY OF SOME RECENT DEVELOPMENTS IN THE DESCRIPTION OF ATMOSPHERIC TURBULENCE USED FOR AIRCRAFT STRUCTURAL DESIGN.
Technical rept., 1 Feb-1 May 66,
Systems Engineering Group, Research and Technology Div., Wright-Patterson AFB, Ohio.
William Hugh Austin, Jr. Aug 66, 31p
SEG-TR-66-45

Descriptors: (*Aircraft, Structures), (*Atmospheric motion, Aircraft), Gust loads, Acceleration, Loading (Mechanics), Gusts, Turbulence, Velocity, Airframes, Systems engineering.

In recent years, aircraft structures engineers have come to rely on power spectral density concepts in the description of atmospheric turbulence used in structures work. This is primarily due to a growing awareness that the spectral approach is far more realistic than the heretofore used 'discrete gust' concept. Although there is a considerable difference of opinion among various investigators on the precise mathematical forms of relations used in the spectral approach, it appears that the approach can be used with confidence on most present day aircraft as long as it is applied in a consistent fashion. Using spectral techniques, it is possible to convert aircraft gust acceleration statistics into a form that can be used by engineers as an accurate description of atmospheric turbulence for various classes of aircraft. These techniques have been applied to a very large sample of B-52 gust acceleration statistics taken during cruise operations to demonstrate the procedure. It is noted that, even if the mathematical forms of relations used in the spectral procedure are changed, changes in the description of atmospheric turbulence can be made rather easily.
AD-643 774 HC$3.00 MF$0.65

A SUMMARY OF NASA DATA RELATIVE TO EXTERNAL-STORE SEPARATION CHARACTERISTICS.
National Aeronautics And Space Administration.
Langley Research Center, Langley Station, Va.
L. W. Mc Kinney, and E. C. Polhamus. Nov 66, 21p NASA-TN-D-3582
Contract 126-13-03-22-23

Descriptors: *Aerodynamic characteristics, *External store, *Separation, Aerodynamic, Aircraft, Bibliography, Carriage, Characteristics, Delivery, Density, External, Field, Flow, Interference, Load, Release, Store, Subsonic, Trajectory.

For abstract, see STAR 05 02.
N67-11345 HC$3.00 MF$0.65

A PRELIMINARY INVESTIGATION OF MODIFIED BLUNT 13 DEG HALF-CONE RE-ENTRY CONFIGURATIONS AT SUBSONIC SPEEDS.
National Aeronautics And Space Administration.
Ames Research Center, Moffett Field, Calif.
G. G. Edwards, and G. C. Kenyon. Mar 61, 47p
NASA-TM-X-501

Descriptors: *Blunt body, *Half-cone, *Horizontal landing, *Reentry vehicle, *Wind tunnel, Aerodynamics, Blunt, Body, Canopy, Control, Elevon, Gear, Horizontal, Landing, Lifting, Model, Moment, Performance, Pitch, Reentry, Stability, Surface, Tunnel, Vehicle, Wind.

For abstract, see STAR 05 02.
N67-11354 HC$3.00 MF$0.65

THE LATERAL AND DIRECTIONAL AERODYNAMIC CHARACTERISTICS OF A RE-ENTRY CONFIGURATION BASED ON A BLUNT 13 DEG HALF CONE AT MACH NUMBERS TO 0.90.
National Aeronautics And Space Administration.
Ames Research Center, Moffett Field, Calif.
G. C. Kenyon. Nov 61, 50p NASA-TM-X-583

Descriptors: *Aerodynamic characteristics, *Blunt body, *Lifting body, *Reentry body, Direction, Fin, Lateral, Pitch, Stability, Yaw.

For abstract, see STAR 05 02.
N67-11355 HC$3.00 MF$0.65

HYPERSONIC AERODYNAMIC CHARACTERISTICS OF WING-BODY CONFIGURATIONS WITH CANARD CONTROLS.
National Aeronautics And Space Administration.
Langley Research Center, Langley Station, Va.
C. W. Brooks, Jr., and L. E. Putnam. Dec 66, 53p NASA-TN-D-3728
Contract 129-13-03-09-23

Descriptors: *Aerodynamic characteristics, *Canard, *Hypersonic flow, *Wing body, Aerodynamic, Apparatus, Body, Characteristics, Configuration, Control, Effect, Flow, Hypersonic, Longitudinal, Planform, Position, Size, Stability, Test, Vertical, Wing.

For abstract, see STAR 05 02.
N67-11811 HC$3.00 MF$0.65

EQUATIONS FOR THE APPLICATION OF WIND-TUNNEL WALL CORRECTIONS TO PITCHING MOMENTS CAUSED BY THE TAIL OF AN AIRCRAFT MODEL.
National Aeronautics And Space Administration.
Langley Research Center, Langley Station, Va.
H. H. Heyson. Nov 66, 20p NASA-TN-D-3738
Contract 721-01-00-18-23

Descriptors: *Aircraft model, *Pitching moment, *Tail, *Wind tunnel wall, Aerodynamic, Aircraft, Application, Correction, Derivation, Distortion, Equation, Expression, Mathematics, Model, Moment, Pitch, Tunnel, Wall, Wind.

For abstract, see STAR 05 02.
N67-11814 HC$3.00 MF$0.65

EXPERIMENTAL EVALUATION OF OUTER CASE BLOWING OR BLEEDING OF SINGLE STAGE AXIAL FLOW COMPRESSOR. PART I - DESIGN OF ROTOR AND BLEEDING AND BLOWING CONFIGURATIONS.
General Electric Co., Lynn, Mass. Advanced Technology And Demonstrator
R. G. Griffin, and L. H. Smith, Jr.. 20 Apr 66, 48p NASA-CR-54587, GE-R66FPD137
Contract NAS3-7618

Descriptors: *Axial flow compressor, *Blowing, Axial, Bleed, Compressor, Design, Evaluation, Flow, Injection, Rotor, Single, Stage.

For abstract, see STAR 05 02.
N67-12096 HC$3.00 MF$0.65

1B. AERONAUTICS

LASER LIGHT ADVANCES IN AVIATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20E.
AD-643 959 HC$3.00 MF$0.65

NEWS OF SCHOOLS OF HIGHER EDUCATION AERONAUTICAL ENGINEERING: VOL. 7, NO. 3, 1964. COLLECTION OF ARTICLES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
28 Sep 66, 150p FTD-MT-64-363
TT-67-60308
Edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) v7 n3 132p 1964.

Descriptors: (*Aeronautics, Symposia), (*Aerodynamics, Symposia), (*Structural parts, Motion), Stresses, Stability, Vibration, Thermodynamics, Turbine blades, Cylindrical bodies, Structural shells, USSR.

Contents: Flow around bodies of stepped form at a small angle of attack by a hypersonic flow of gas; State of stress of cylindrical shells with elastic frames; Equations of sandwich plates of variable thickness; Investigation of stability of shells of cylindrical class on the basis of complex equations; Calculation of geometry of equidistant moving contours; The influence of temperature, pressure and coefficient of excess of air proceeding into a calorimeter on calority of kerosene; Calculation of losses upon sudden expansion of flow; Distribution of temperature along the profile of a cooled turbine blade with heat-insulated edges; On the problem of natural vibrations of blades of an axial compressor; Vibrations of a cylindrical shell partially filled by fluid; Vibrations of a hemispheric shell filled by a fluid; Processing the results of traversing turbines on a digital computer; Determination of coefficients of heat radiation in a pipe according to distribution of temperatures on the contour of its longitudinal section; Investigation of distribution of temperature along the profile of a bushing blade; Approximate method of calculation of a thermal insulation layer with the consideration of radiation; A more precise definition of the concept 'technological character of designs'; Bibliography; 'Selection of parameters and calculation of axial active turbines for drive of assemblies.'
AD-644 068 HC$3.00 MF$0.65

RECENT FINDINGS ON THE IMPAIRMENT OF AIRMANSHIP BY ALCOHOL,
Federal Aviation Agency, Washington, D. C. Office of Aviation Medicine.
Stanley R. Mohler. Sep 66, 15p AM-66-29

Descriptors: (*Alcohols, *Aviation accidents), Ingestion (Physiology), Aviation personnel, Aviation safety, Toxicity, Blood analysis, Performance (Human), Pilots.

A significant number of fatal general aviation accidents have definitely been associated with the effects of consumed alcohol. These effects can markedly impair the judgment and proficiency of airmen. Aspects of this subject are explored in depth. (Author)
AD-644 119 HC$3.00 MF$0.65

FLIGHT DYNAMICS: AIRCRAFT TRAJECTORIES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. V. Ostoslavskii, and I. V. Strazheva. 19 May 66, 673p FTD-HT-66-243
TT-67-60326
Unedited rough draft trans. of mono. Dinamika Poleta, Traektorii Letatelnykh Apparatov, Moscow 1963 430p.

Descriptors: (*Flight paths, Mathematical prediction), (*Aircraft, Flight paths), Rocket trajectories, Dynamics, Airplanes, USSR.

The book introduces methods for calculating the flight trajectory of different types of aircraft: airplanes, guided airplane-rockets, ballistic rockets and rocket planes. Methods of optimization of flight trajectories based on the application of variational calculus are examined. Brief reports of the application of mathematical devices in problems of flight dynamics are introduced. (Author)
AD-644 141 HC$3.00 MF$0.65

KONSTANTIN EDUARDOVICH TSIOLKOVSKII: SELECTED WORKS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
B. N. Vorobev, and V. N. Sokolskii. 5 May 66, 758p FTD-MT-64-241
TT-67-60327
Edited machine trans. of mono. Konstantin Eduardovich Tsiolkovskii: Izbrannye Trudy, Moscow, 1962 535p.

Descriptors: (*Aeronautics, Scientific research), (*Aerodynamics, Scientific research), (*Astronautics, Scientific research), (*Space communication systems, Scientific research), Reviews, Motion, Spacecraft, Space flight, Turbines, USSR.

The volume includes the basic works of Tsiolkovskii on aviation, aerodynamics, rocket technology and interplanetary communication.
AD-644 143 HC$3.00 MF$0.65

1C. AIRCRAFT

SOVIET HELICOPTER CONSTRUCTION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. M. Izakson. 21 Nov 66, 172p FTD-MT-65-90
TT-67-60186
Edited machine trans. of mono. Sovetskoe Vertoletostroenie, Moscow, 1964 p163, 178-83, 196-209.

Descriptors: (*Helicopters, Construction), Design, USSR, Autogyros, Vertical take-off planes, Aircraft, Helicopter engines, Helicopter rotors, Performance (Engineering), Aviation personnel.

The book concerns the history of helicopter design and construction in general and Soviet helicopters in particular, divided into a number of stages. During the description of each stage a short survey of the stage of foreign helicopter construction is also given. Also, all Soviet experiments on autogyros are described. Classifications of presently used helicopters and a short survey of the basic technical problems of conte ıporary helicopter construction are given in the book. Some biographical data of the Soviet helicopter pioneers are given. The author is one of the pioneers of Soviet helicopter design.
AD-643 594 HC$3.00 MF$0.65

PARACHUTE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
E. F. Efremov, G. V. Petkus, and K. S. Morozov. 9 Sep 66, 4p FTD-HT-66-104
Unedited rough draft trans. of Patent (USSR) 171 274, appl. 460905/40-23, 4 Jan 65.

Descriptors: (*Parachutes, Patents), USSR, Design, Stabilization systems, Lift, Hemispherical shells, Bodies of revolution, Configuration.

The object of the invention is a parachute with a canopy in the form of a circular belt. To increase its coefficient of lift and its stability, it is equipped with a small hemispherical canopy, the shroud lines of which go through an eye ring that is fastened to the central shroud line and the external rim is connected with the internal edge by four mutually perpendicular shroud lines. (Author)
AD-643 703 HC$3.00 MF$0.65

DRAG PARACHUTE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. L. Kadyshev, S. D. Khakhilev, and I. S. Andriyashenko. 9 Sep 66, 5p FTD-TT-66-105
Unedited rough draft trans. of Patent (USSR) 171 275, appl. 702105/40-23, 16 Apr 59.

Descriptors: (*Drag parachutes, Actuators), Patents, USSR, Reliability, Springs, Safety.

The object of the invention is a drag parachute. To increase the reliability of the parachute and jump safety, it is made in the form of a spherical spring mechanism with the upper part covered by a dense fabric and the lower part covered with a mesh and equipped with an external conical spring. (Author)
AD-643 704 HC$3.00 MF$0.65

A SUMMARY OF SOME RECENT DEVELOPMENTS IN THE DESCRIPTION OF ATMOSPHERIC TURBULENCE USED FOR AIRCRAFT STRUCTURAL DESIGN.
Systems Engineering Group, Research and Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 1A.
AD-643 774 HC$3.00 MF$0.65

A COURSE IN AIRCRAFT DESIGN,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
M. N. Shulzhenko, and A. S. Mostovoi. 21 Sep 66, 558p FTD-MT-66-32
TT-67-60334
Edited machine trans. of Mono. Kurs Konstruktsii Samoletov, 2d, ed., Moscow, 1965 563p.

Descriptors: (*Aircraft, Design), (*Structural parts, Aircraft), Loading (Mechanics), Aerodynamics, Landing gear, Wings, Fuselages, Aircraft cabins, Aircraft engines, Control systems.

This text was prepared for use by students in aeronautical technical schools specializing in aircraft construction and consists of the following major headings: fundamentals of aircraft structural mechanics; aircraft design fundamentals; and design and strength analysis of aircraft assemblies.
AD-643 921 HC$3.00 MF$0.65

CONTROL OF SUPERSONIC AIRCRAFT,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
F. I. Sklyanskii. 31 May 66, 385p FTD-MT-65-89
TT-67-60323
Edited machine trans. of mono. Upravlenie Sverkhzvukovogo Samoleta, Moscow, 1964 388.

Descriptors: (*Supersonic planes, Control systems), Stabilization systems, Maneuverability, Roll, Control surfaces, Aerodynamic configurations, Deformation, Aviation safety, USSR.

Contents: General information, equations of motion, definitions; Stability and controllability characteristics of aircraft, formation of forces on control levers of aircraft with non-power-assisted (boosterless) control systems; Change of characteristics of stability and controllability of aircraft at transonic and supersonic speeds of flight; Improvement of stability and controllability characteristics by methods of aerodynamic design and selection of shapes of supersonic aircraft; Power control formation of forces on aircraft control levers with power control; Application of automatic devices for improvement of characteristics of dynamic stability and controllability of present-day aircraft; Certain questions of the further development of control systems; The influence of deformation of the aircraft structure on its stability and controllability; Increase of safety of flight and emergency control.
AD-644 145 HC$3.00 MF$0.65

MATERIAL PROPERTIES HANDBOOK. VOLUME IV - HEAT RESISTING ALLOYS.
Royal Aeronautical Society, London (England). Engineering Sciences Data Unit.
For primary bibliographic entry see Field 11F.
For abstract, see STAR 05 02.
N67-11244 HC$3.00 MF$0.65

THE STABILITY OF CAPTIVE BALLOONS FOR INSTRUMENT FLYING, INCLUDING ANALYSIS OF MULTI-CABLE CONFIGURATIONS.
Wyle Labs., Inc., Huntsville, Ala. Testing Labs.
R. C. Potter. Nov 65, 102p NASA-CR-79508, WR-65-28
Contract NAS8-5384

Descriptors: *Aerodynamic characteristics, *Airborne equipment, *Balloon, *Computer program, *Stability, Acoustic, Aerodynamic, Airborne, Cable, Characteristics, Computer, Configuration, Design, Drag, Equilibrium, Equipment, Field, Fortran, Lift, Measurement, Multiple, Program, Single.

For abstract, see STAR 05 02.
N67-11729 HC$3.00 MF$0.65

A METHOD FOR PRELIMINARY ESTIMATION OF FATIGUE STRENGTH IN AIRCRAFT PRIMARY STRUCTURES.
Saab Aircraft Co., Linkoping (Sweden).
S. E. Larsson. May 65, 48p SAAB-TN-57

Descriptors: *Fatigue, *Structural material, Aircraft, Amplitude, Calculation, Damage, Element, Joint, Load, Material, Rivet, Skin, Spectrum, Static, Stress, Structural.

For abstract, see STAR 05 02.
N67-11754 HC$3.00 MF$0.65

1E. AIR FACILITIES

CWEA-3 MULTI-ENGINE ANALYZER (U).
Final rept.,
Curtiss-Wright Corp., Caldwell, N. J. Curtiss Div.
C. J. Zabriskie, and R. G. Locklin. 30 Nov 66, 101p -3003
Contract NOw-65-0094

Descriptors: (*Jet engines, Frequency analyzers), (*Frequency analyzers, Acoustic equipment), Performance (Engineering), Maintenance equipment, Malfunctions, Analysis, Design, Aircraft engines, Maintenance.
Identifiers: CWEA-3 Analyzer.

The purpose of the work was to (1) conduct a field evaluation of the CWEA-2 interim sonic engine analyzer, (2) perform a research and development program to obtain acoustical field test data on J79 engines, and (3) design and fabricate a multi-engine sonic analyzer. The following conclusions are derived: (1) The performance record of the CWEA-2 analyzer during the evaluation testing and subsequent continued use has established a high degree of confidence in its reliability as a valuable maintenance tool. (2) The results of the data obtained from the J79 component change program were useful in establishing engine component condition limits for the CWEA-3 analyzer. However, the cost and time consumed in conducting a component change program is not worth the effort inasmuch as better results can be obtained during a field evaluation of the analyzer. (3) A study of the CWEA-2 analyzer circuitry, and the portability, maintainability and power requirements for an improved analyzer design resulted in a complete redesign of the CWEA-2 analyzer which was incorporated into the resulting CWEA-3 analyzer.
AD-643 938 HC$3.00 MF$0.65

EVALUATION OF WIRELESS CONTROL SYSTEM FOR AIRPORT AIDS.
Final rept.,
National Aviation Facilities Experimental Center, Atlantic City, N. J.
Robert B. Frack. Sep 66, 32p
SRDS-RD-66-64

Descriptors: (*Remote control systems, Lighting equipment), (*Lighting equipment, Airports), Multiplex, Transmitter-receivers.

Laboratory and field tests were conducted to determine if a Wireless Control System developed for the Federal Aviation Agency (FAA) could satisfactorily replace existing underground wiring circuits for control of airport lighting aids. Test results indicated the system was unstable; subject to interference from external RF noise; and unable to provide simultaneous, reliable, three-channel operation. Interface units were designed to operate airport lighting aids utilizing the signal developed at the output of the system Remote Station. Operational testing of the system was cancelled due to its unreliable operation. It was concluded that the system, in its present design, was not suitable as a replacement for underground wiring circuits to control airport lighting aids. A recommendation was made that the system not be utilized for control of airport lighting aids. (Author)
AD-644 018 HC$3.00 MF$0.65

2. AGRICULTURE

2E. ANIMAL HUSBANDRY

PHYSIOLOGICAL JOURNAL OF THE USSR (SELECTED ARTICLES),
Foreign Techpology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 6P.
AD-643 983 HC$3.00 MF$0.65

3. ASTRONOMY AND ASTROPHYSICS

3A. ASTRONOMY

THE SHAPE OF THE MOON AS DEDUCED FROM THE ORBITER DETERMINATION OF ITS GRAVITATIONAL FIELD,
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
C. L. Goudas, Zdenek Kopal, and Zdenka Kopal. Oct 66, 8p D1-82-0570, Mathematical Note-485
Also available from the author.

Descriptors: (*Moon, *Extraterrestrial topography), Gravity, Harmonic analysis.

Preliminary values of the lunar gravity field as obtained from an analysis of the tracking data of Lunar Orbiter 1 are used to express the basic features of the figure of the Moon. Some tentative conclusions are drawn regarding the homogeneity, the non-hydrostatic form, and the solidity of the lunar globe. (Author)
AD-643 975 HC$3.00 MF$0.65

TARTU STATION FOR OBSERVING ARTIFICIAL EARTH SATELLITES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 22C.
AD-644 014 HC$3.00 MF$0.65

THERMOLUMINESCENCE OF METEORITES.
Revised ed.,
Bern Univ. (Switzerland). Physikalisches Institut.
F. G. Houtermans, and A. Liener. 31 Mar 66, 12p
AFOSR-66-2712
Grant AF-EOAR-77-65
Revision of manuscript submitted 21 Jan 64.
Availability: Published in Journal of Geophysical Research v71 n14 p3387-96 Jul 15 1966.

Descriptors: (*Meteorites, *Thermoluminescence), Measurement, Switzerland, Experimental data, Test methods.

The experimental techniques used for measuring thermoluminescence are described. The glow curves of achondrites differ markedly from subclass to subclass in their artificially excited glow curves. A fair correlation exists between the radiation ages and the luminescence intensity. The olivine components of pallasites yield very low luminescence whereas the silicate components of mesosiderites (with the exception of Weatherford) exhibit distinct peaks at about 90C. To a good approximation the luminescence intensity of the chondrites is proportional to their radiation ages. If a correction for the radiogenic part of the thermoluminescence is applied, approximate radiation ages can be estimated from thermoluminescence data. (Author)
AD-644 088 Not available from CFSTI.

A MONITORING SYSTEM FOR SYNOPTIC OBSERVATIONS OF JOVIAN AND SOLAR DECAMETER-WAVE RADIO EMISSIONS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. K. Alexander. Oct 66, 38p NASA-TM-X-55611, X-615-66-498

Descriptors: *Jupiter (planet), *Monitor, *Radio emission, Antenna, Decametric, Emission, Interferometer, Network, bservation, Radio, Solar, Synoptic, Wave.

For abstract, see STAR 05 02.
N67-11394 HC$3.00 MF$0.65

RADIO ASTRONOMY.
Massachusetts Inst. Of Tech., Cambridge.
A. H. Barrett. 1966, 9p NASA-CR-79923, QPR-83
Contract NSR-22-009-120, Grant NSG-419

Descriptors: *Astronomical spectrum, *Microwave radiometer, *Radio astronomy, *Spectral emission, *Visible radiation, Astronomy, Discrete, Emission, Frequency, Hydrogen, Interferometry, Jupiter (planet), Measurement, Microwave, Oxygen, Radiation, Radio, Radiometer, Source, Spectral, Venus, Visible.

For abstract, see STAR 05 02.
N67-11853 HC$3.00 MF$0.65

STUDY OF LUNAR, PLANETARY, AND SOLAR TOPOGRAPHY FIRST PHASE REPORT, 1 JUL. 1965 - 15 APR. 1966.
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
C. E. Campbell. Nov 66, 130p NASA-CR-650
Contract NAS12-19

Descriptors: *Lunar surface, *Planetary surface, *Topography, Acquisition, Holography, Imagery, Information, Measurement, Method, Parallax, Solar, Stellar, Stereography.

For abstract, see STAR 05 02.
N67-11951 HC$3.00 MF$0.65

RADAR STUDIES OF THE MOON.
Lincoln Lab., Mass. Inst. Of Tech., Lexington.
23 Nov 66, 21p NASA-CR-80080, QPR-4
Contract NSR-22-009-106

Descriptors: *Lunar map, *Radiometry, *Thermal emission, Brightness, Display, Emission, Ephemeris, Frequency, Linear, Lunar, Map, Microwave, Polarization, Radar, Reflection, System, Temperature, Thermal.

For abstract, see STAR 05 02.
N67-12071 HC$3.00 MF$0.65

RADAR DOPPLER SPECTROSCOPY OF MARS. I - ELEVATION DIFFERENCES BETWEEN BRIGHT AND DARK AREAS.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
R. M. Goldstein, J. B. Pollack, and C. Sagan. 6 Sep 66, 79p NASA-CR-80134, SAO SPECIAL REPT.-221
Contracts NAS7-100, NGR-09-015-023

Descriptors: *Doppler radar, *Mars surface, *Radar observation, *Spectroscopy, *Topography, Brightness, Dark, Elevation, Frequency, Mars (planet), Observation, Radar, Scanning, Surface, Theory.

For abstract, see STAR 05 02.
N67-12271 HC$3.00 MF$0.65

3B. ASTROPHYSICS

DECAMETRIC RADIO PULSES FROM JUPITER: CHARACTERISTICS,
Florida Univ., Gainesville. Dept. of Physics and Astronomy.
C. N. Olsson, and Alex G. Smith. 1 Apr 66, 3p
Contract Nonr-580 (06)
Supported in part by NSF, Army Research Office, and NASA.
Availability: Published in Science v153 n3733 p289-90 Jul 15 1966.

Descriptors: (*Jupiter (Planet), *Extraterrestrial radio waves), Electromagnetic pulses, High frequency, Analysis.

On occasion the decametric radio bursts from Jupiter contain pulses of millisecond duration. Study of data for 2 years show that the distribution in Jovian longitude of these fast pulses is different from that of the more common pulses of longer duration. The two classes of pulses also appear to be differently affected by the position of the innermost Galilean satellite. (Author)
AD-643 454 Not available from CFSTI.

ASYMMETRICAL STOP ZONES IN JUPITER'S EXOSPHERE,
Florida Univ., Gainesville. Dept. of Physics and Astronomy.
Samuel Gulkis, and Thomas D. Carr. 1966, 6p
Contract Nonr-580 (06)
Availability: Published in Nature v210 n5041 p1104-5 Jun 11 1966.

Descriptors: (*Jupiter (Planet), *Extraterrestrial radio waves), Propagation, Magnetic fields, Exosphere.

A variety of mechanisms has been suggested to account for the bursts of radio noise which are received sporadically from Jupiter at decametre wavelengths. For example, there are the Cerenkov

emission model of Warwick, the Doppler-shifted cyclotron emission model proposed by Ellis and McCulloch, and the 'escaped-whistler' model, based on the ideas of Carr, Field, and Chang. In these three models and in others, emission occurs in the extraordinary mode near or well below the electron gyrofrequency, and the radiation reaching the Earth is initially guided by Jupiter's magnetic field. This article points out that in addition to altering the beaming pattern, another effect of field distortions is to produce a variation with longitude in the thickness of the stop zone for frequencies in the vicinity of the gyrofrequency. Cerenkov radiation , Doppler-shifted cyclotron radiation, and whistlers would all be expected to escape most often from regions in which the stop zone is thinnest.
AD-643 456 Not available from CFSTI.

INFRARED BALLOON ASTRONOMY.
Final rept., 1 Aug 61-30 Jun 66,
Johns Hopkins Univ., Baltimore, Md. Lab. of Astrophysics and Physical Meteorology.
John Strong. 1 Jul 66, 302p
AFCRL-66-616
Contract AF 19 (628)-4334

Descriptors: (*Astronomy, Spectra (Infrared)), (*Venus (Planet), Astrophysics), Balloons, Tracking telescopes, Photomultipliers, Spectrum analyzers, Infrared equipment, Planetary atmospheres, Refrigeration systems, Water vapor, Ice, Clouds, Infrared radiation, Optical equipment, Airborne.
Identifiers: BAL-AST project.

The report describes instrumentation used in a balloon gondola to make infrared astronomical studies of Venus with a telescope of 16 inches aperture at 16 miles' altitude. With it, water vapor was discovered above the clouds in the Cytherean atmosphere; and ice was identified as the composition of the clouds themselves. Solutions to optical and spectroscopic problems, in connection with these scientific missions, are described. For the water vapor determination, a photomultiplier with S-1 photocathode, cooled by a dry ice refrigerator, was used behind the multiple exit slits (21) of a modified Ebert spectrometer. For the cloud determination, multiple indium arsenide detectors (3), similarly cooled, were focused on the exit focal plane of the spectrometer. Gratings served to disperse the spectrum. An aspheric mirror corrected aberration of the spherical primary mirror. An off-axis lens corrected residual aberrations in the spectrometer. The automatic acquisition and tracking, at altitude, using variable off-set angles, from the sun as the fiducial point, is considered both instrumentally, and as a navigation problem. Laboratory measures of the reflectivity of various candidate cloud materials are presented, with a description of equipment used. The scientific results are described in detail and some interpretations are given. (Author)
AD-643 567 HC$3.00 MF$0.65

RESULTS OF RECENT INVESTIGATIONS OF JUPITER'S DECAMETRIC RADIATION,
Arecibo Ionospheric Observatory, Puerto Rico.
T. D. Carr, S. Gulkis, A. G. Smith, J. May, and G. R. Lebo. 1965, 9p
AFOSR-66-2683
Contract AF 49 (638)-1156
Availability: Published in Radio Science Journal of Research NBS/USNC-URSI v69D n12 p1530 6 Dec 1965.

Descriptors: (*Jupiter (Planet), *Extraterrestrial radio waves), High frequency, Measurement, Upper atmosphere, Polarization, Radiofrequency interference, Propagation, Periodic variations.

The activity of Jupiter's decametric radiation appears to be greatest between 5 and 10 Mc/s, but measurements made below 10 Mc/s are subject to large ionospheric errors. No significant change in rotation period has appeared since 1960. The effect of the satellite Io as reported by Biggs has been corroborated. Marked variations in axial ratio with System III longitude were observed, from which estimates were made of the meridians of the poles. A ray-tracing study was made of the focusing of radiation escaping from possible Jovian field-alined ducts. The effect of asymmetrical stop zones is discussed. A possible explanation of the influence of Io is offered. (Author)
AD-643 582 Not available from CFSTI.

STUDIES OF THE PECULIAR A STARS. IV. THE RELATIVE ABUNDANCES OF FOUR IRON-PEAK ELEMENTS.
Revised ed.,
California Inst. of Tech., Pasadena.
Leonard Searle, W. T. Lungershausen, and W. L. W. Sargent. 17 Jan 66, 14p
AFOSR-66-2686
Contract AF 49 (638)-21
Prepared in cooperation with Australian National Univ., Canberra. Mount Stromlo Observatory and California Univ., San Diego. Revision of manuscript submitted 26 Nov 65.
Availability: Published in The Astrophysical Journal v145 n1 p141-52 Jul 1966.

Descriptors: (*Stars, Line spectrum), Abundance, Ionization potentials, Titanium, Chromium, Manganese, Iron.

Equivalent widths are give for twenty-nine unblended lines of Fe II, Cr II, and Ti measured in the wavelength interval lambda lambda 3200-3520 on 10 A/mm spectrograms of each of twenty-one normal and peculiar A and B stars. These include four lambda 4200 Si stars, seven Mn stars, five Eu-Cr-Sr stars, one Am star, and four normal stars. The relative strengths of the measured lines of these four elements are very insentive to changing excitation conditions and are used to determine relative abundances by coarse curve-of-growth techniques. The main results of the analyses are as follows: (a) The excitation temperatures obtained for the peculiar stars are similar to those of normal stars of the same color. (b) All the Ap stars, with the exception of the Mn stars, have abnormally high microturbulent velocities. (c) The Mn stars have an abnormal distribution of abundances among the four elements studies. The Mn stars have a ratio of Mn: Fe which is from 6 to 60 times higher than normal. In the Mn stars the ratios Cr: Fe and Ti: Fe are also abnormal, but these ratios differ from star to star. (d) In the case of the Si-rich and O-poor varieties of Ap stars the relative abundances of the four elements studied are entirely normal. In particular, the Cr/Fe abundance ratio is normal in Ap stars of the Eu-Cr and Sr-Eu-Cr types. In these stars the enhancement of the Cr lines seen at low dispersion is real, but the lines of Fe, Ti, and Mn are also enhanced. (Author)
AD-643 587 Not available from CFSTI.

SURVEY ON EARTH ALBEDO.
Technical note,
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Laird P. Whitehill. 11 Oct 66, 97p TN-1966-53
ESD-TR-66-455
Contract AF 19 (628)-5167

Descriptors: (*Earth (Planet), *Albedo (Astronomy)), Rayleigh scattering, Reflection, Intensity, Satelljtes (Artificial), Maps.

The paper is a study of the conditions that can be expected for the intensity of light reflected and scattered from the earth. The albedo of the earth is defined and the albedo of various surfaces, and regions of the earth are discussed. An attempt is made to survey typical results of measurements of Tiros data. The albedo of the earth covered by a Rayleigh atmosphere is presented in graphical form and the intensity distribution over the earth is plotted for various orientations of observer viewed spot and sun. A calculation of expected minimum response is made for a specific photodiode for a certain geometry and a method is presented to enable interested persons to easily perform similar calculations for different geometries. (Author)
AD-643 649 HC$3.00 MF$0.65

SHOCK WAVES IN THE INTERPLANETARY MEDIUM.
Interim rept.,
Cornell-Sydney Univ. Astronomy Center, Ithaca, N. Y.
M. Simon, and W. I. Axford. 4 Apr 66, 10p
CSUAC-38
AFOSR-66-2638
Contract AF 49 (638)-1527
Availability: Published in Planetary Space Sci. v14 p901-8 1966.

Descriptors: (*Shock waves, *Solar corona), (*Solar flares, Shock waves), Magnetic fields, Distortion, Equations, Solar disturbances.

A similarity solution is given for spherically symmetric, radial flow due to a point source, which is an idealization of the disturbance produced in the interplanetary medium by a sudden expansion of the solar corona following a flare. The solution illustrates the formation of forward-reverse shock pairs, essentially as postulated by Sonnett and Colburn. The distortion of the interplanetary magnetic field by the disturbance is also discussed briefly. (Author)
AD-643 671 Not available from CFSTI.

ON SOME PROPERTIES OF SOLAR STORM BURSTS IN THE 200 MC/S REGION,
Oslo Univ. (Norway). Inst. of Theoretical Astrophysics.
Hans Kr. Eckhoff. May 66, 32p Rept. no. 18
Contract AF 61 (052)-743

Descriptors: (*Solar disturbances, Astrophysics), (*Solar radiation, Astronomical data), Extraterrestrial radio waves, Magnetic storms, Sunspots, Solar flares, Astronomical observatories, Magnetic fields.

More than 4000 storm bursts recorded with the swept frequency receiver at Harestua during an intense noise storm occurring in August, 1961, have been analysed. From the recordings three periods were selected for a close examination. During one of these a very remarkable change in burst duration took place. The abnormal conditions lasted for some minutes and the period is henceforth referred to as the 'flash-period'. The mean 'total duration' of the storm bursts occurring outside the flash period was found to be 0.43 seconds and the mean 'total bandwidth' amounted to 5.6 Mc/s. During the flash period the mean total duration of the bursts decreased to 0.22 seconds and also the spread in burst durations diminished. No change in the distribution of burst bandwidths was found during the flash-period. Frequency drift is discussed in connection with 'flash-bursts' and ordinary type I bursts. Many complex bursts were studied by means of an isodensitometer. As a re-

sult of this a maximum duration of 0.8 seconds was established for the bursts in the material.
AD-643 814 HC$3.00 MF$0.65

A GUIDE TO THE SOLAR CORONA,
Colorado Univ., Boulder. Dept. of Astro-Geophysics.
Donald E. Billings. 1966, 333p
Grants Nonr (G)-00059-64, Nonr (G)-00046-65
Prepared in cooperation with High Altitude Observatory, Boulder, Colo.
Availability: Hard copy available from Academic Press, New York-London, $14.00.

Descriptors: (*Solar corona, Scientific research), History, Photographic analysis, Gases, Mechanical properties, Density, Temperature, Magnetic fields.

Contents: Historical introduction; Observational techniques; Observational aspects of the corona; Special methods of data analysis; The nature of the coronal gas; Radiative processes in the corona; The mechanics of the corona; Density distribution in the corona; The temperature of the corona; Magnetic fields in the corona; Relation to other activity; The corona in the universe.
AD-643 836 Not available from CFSTI.

ANISOTROPIC DIFFUSION OF SOLAR COSMIC RAYS,
Minnesota Univ., Minneapolis. Cosmic Ray Group.
Leonard Francis Burlaga. Dec 66, 68p CR-88

Descriptors: (*Cosmic rays, Propagation), (*Solar radiation, Diffusion), Mathematical models, Sun, Magnetic fields, Intensity, Solar flares, Cosmic ray bursts, Protons.

A mathematical model is presented and a relatively simple solution is obtained which describes the basic characteristics of solar cosmic ray propagation. The model postulates that solar cosmic rays diffuse anisotropically in the interplanetary medium because of the irregular spiral interplanetary magnetic field.
AD-643 863 HC$3.00 MF$0.65

THE ELECTRON AND POSITRON ENERGY DISTRIBUTION FROM PROTON-ANTIPROTON ANNIHILATION AT REST,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
For primary bibliographic entry see Field 20H.
AD-643 885 Not available from CFSTI.

FLUX LIMITS FOR HIGH ENERGY GAMMA RAYS FROM QUASARS AND OTHER POSSIBLE COSMIC RAY SOURCES.
Interim rept.,
University Coll., Dublin (Eire).
C. D. Long, B. McBreen, N. A. Porter, and T. C. Weekes. 1965, 6p
AFOSR-66-2012
Grant AF-EOAR-80-63
Availability: Published in Proceedings of International Conference on Cosmic Rays (9th), London p318-20 1965.

Descriptors: (*Cosmic ray bursts, Statistical analysis), (*Gamma rays, Cosmic ray bursts), Cosmic ray telescopes, Sensitivity, Resolution, Scanning, Extraterrestrial radio waves, Sources, Supernovae, Variable stars, Interstellar matter, Eire.
Identifiers: Quasi-stellar radio sources.

A directional night sky Cerenkov telescope has been used to look for exess showers coming from the direction of quasars and other possible sources. The threshold detecting energy is 5x10 to the 12th power eV; an excess would indicate a flux of gamma rays of this energy. The angular resolution of the system was 3 degrees at the zenith and a counting rate of 40-100 showers/minure was obtained. Both draft scans and ON/OFF comparisons were used and 70000 showers were observed between January 1964 and April 1965. Of the five quasars observed, all gave a slight excess which approaches statistical significance. Due to atmospheric fluctuations, however, Poisson statistics do not apply. Corrections for systematic errors have been applied and tend to increase the positive effect on the quasars. Flux limits are given for all nine sources observed; these do not conflict with current astrophysical theory. The limitations of the technique are discussed and progress on the photography of showers using the optical delay image intensifier system at Dublin is described. (Author)
AD-643 914 Not available from CFSTI.

NEW PRINCIPLES OF CONSTRUCTION OF THE PHYSICAL THEORY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20J.
AD-643 962 HC$3.00 MF$0.65

TRANSIENT BEHAVIOR OF A HEATED STELLAR ATMOSPHERE.
Revised ed.,
Sydney Univ. (Australia). Dept. of Aeronautical Engineering.
G. A. Bird. 27 Sep 65, 5p
AFOSR-66-2550
Grant AF-EOAR-65-64
Revision of manuscript submitted 9 Aug 65.
Availability: Published in The Physics of Fluids v8 n12 p2289-91 Dec 1965.

Descriptors: (*Solar atmosphere, Gas flow), Thermodynamics, Heating, Subsonic flow, Supersonic flow, Australia.

The note presents the results of a numerical investigation of the unsteady flow which follows the sudden application of heating to a region of a static atmosphere. The rate of heat addition did not depend directly on time but was related, in various ways, to the thermodynamic properties of the heated region. In all cases the flow settled down to a steady subsonic-supersonic expansion. (Author)
AD-644 031 Not available from CFSTI.

ON PERIODICITIES OF SOLAR ACTIVITY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Chen Biao, and Yin Chun-lin. 28 Sep 66, 15p
FTD-HT-66-115
TT-67-60303
Edited trans. of Tien Wen Hsueh Pao (Chinese People's Republic) v13 n1 p89-96 1965.

Descriptors: (*Sunspots, Numerical analysis), Solar disturbances, Solar flares, Periodic variations, Fourier analysis, Least squares method, Solar atmosphere, Chromosphere, Solar corona, Geometric forms.

The smoothed monthly mean relative sunspot numbers from 1750 to 1960 inclusive were used in this paper to derive their periodicities. Based on the two periods obtained, an approximation expression for the relative numbers was found.
AD-644 061 HC$3.00 MF$0.65

THE BEHAVIOR OF RADIATION BELTS AND ANOMALOUS ABSORPTION OF COSMIC RADIO NOISE IN THE ZONE OF THE POLAR AURORA DURING THE MAGNETIC STORMS OF 12-14 FEBRUARY AND 20-21 FEBRUARY 1964,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 4A.
AD-644 063 HC$3.00 MF$0.65

THE POSSIBILITIES OF COMMUNICATION WITH EXTRA-TERRESTRIAL CIVILIZATIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. M. Gindilis. 27 Sep 66, 27p FTD-HT-66-517
TT-67-60307
Unedited rough draft trans. of Zemlya i Vselennaya (USSR) v1 n1 p18-27 1965.

Descriptors: (*Galaxies, Communication systems), Radio astronomy, Stars, Space biology, Planets, Radio communication systems, USSR.

CONTENTS: How many civilizations are there in the universe; Types of contacts between civilizations; Radio communication between civilizations; Radio communication between civilizations of the Earth type; Receiving information from super-civilizations. (Author)
AD-644 067 HC$3.00 MF$0.65

OBSERVATIONS OF GALACTIC AND EXTRA-GALACTIC EMISSION AT 408Mc/s. THE DETERMINATION OF THE ACCURATE POSITIONS OF RADIO SOURCES BY THE LUNAR OCCULTATION TECHNIQUE. OBSERVATIONS OF EMISSION FROM FLARE STARS.
Progress rept., no. 3, Apr-Jun 66,
Nuffield Radio Astronomy Labs., Jodrell Bank (England).
C. G. T. Haslam, M. J. S. Quigley, A. C. Lyne, and A. C. B. Lovell. 1966, 5p
Contract N62558-3928
See also AD-642 307.

Descriptors: (*Radio astronomy, *Stars), Position finding, Extraterrestrial radio waves, Astrophysics, Galaxies, Radio interferometers, Celestial mechanics, Ultrahigh frequency, Moon, Data.
AD-644 160 HC$3.00 MF$0.65

ANALYSIS AND INTERPRETATION OF MAGNETIC FIELD MEASUREMENTS BETWEEN EARTH AND MARS RECEIVED FROM MARINER IV SEMIANNUAL PROGRESS REPORT, DEC. 1, 1965 - AUG. 31, 1966.
Brigham Young Univ., Provo, Utah.
31 Aug 66, 30p NASA-CR-79398
Contract NGR-45-001-011

Descriptors: *Interplanetary magnetic field, *Mariner iv space probe, Configuration, Earth, Field, Fluctuation, Geomagnetic, Interplanetary, Magnetic, Mars, Measurement, Probe, Space.

For abstract, see STAR 05 02.
N67-12069 HC$3.00 MF$0.65

METEOR MASSES AND LUMINOSITY.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
F. Verniani. 26 Aug 66, 53p NASA-CR-80093, SAO SPECIAL REPT.-219
Contract NSR-09-015-033

Group 3B — Astrophysics

Descriptors: *Astrophysics, *Luminous intensity, *Meteor, Analysis, Asteroid, Comet, Data, Density, Fragmentation, Intensity, Luminosity, Photography, Velocity.

For abstract, see STAR 05 02.
N67-12153 HC$3.00 MF$0.65

LUNAR SURFACE ROUGHNESS COMMINUTION STUDY FINAL REPORT, 20 JUL. 1964 - 7 APR. 1965.
Allis-chalmers Mfg. Co., Milwaukee, Wis. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Space And Defense Sciences Dept.
L. H. Faust, and T. P. Meloy. Apr 65, 90p
NASA-CR-80137
Contracts NAS7-100, JPL-950919
Prepared For Jpl

Descriptors: *Cratering, *Lunar surface, *Surface roughness, Comminution, Crater, Distribution, Dust, Estimation, Formation, Landing, Lunar, Meteor, Roughness, Size, Surface.

For abstract, see STAR 05 02.
N67-12165 HC$3.00 MF$0.65

MOVIE OF THE INTERPLANETARY MAGNETIC FIELD.
California Univ., Berkeley. Space Sciences Lab.
N. F. Ness, A. D. Ritchie, and J. M. Wilcox. 14 Oct 66, 15p NASA-CR-80128
Grant NSG-243-62, Contract NONR-3656/26/
Submitted For Publication Its Ser. No. 7, Issue No. 53

Descriptors: *Imp, *Interplanetary magnetic field, *Motion picture, *Satellite observation, Character, Dynamic, Field, Geomagnetic, Interplanetary, Magnetic, Magnetometer, Motion, Observation, Orbit, Picture, Proton, Satellite, Storm.

For abstract, see STAR 05 02.
N67-12172 HC$3.00 MF$0.65

ANALYSIS OF LUNAR SURFACES FINAL REPORT, FEB. 1961 - JUL. 1965.
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
A. Turkevich. May 66, 16p NASA-CR-75121, EFINS-66-49
Grant NSG-127-61

Descriptors: *Alpha radiation, *Chemical analysis, *Lunar surface, Alpha, Analysis, Beam, Charge, Chemical, Composition, Experiment, Interaction, Ionization, Lunar, Particle, Scattering, Spectrum, Surface, Surveyor project, Vehicle.

For abstract, see STAR 05 02.
N67-12180 H $3.00 MF$0.65

CHARGED DUST PARTICLES IN INTERPLANETARY SPACE.
O Zaryazhennykh Pylevykh Chastitsakh Mezhplanetnogo Prostranstva
Consultants And Designers, Inc., Arlington, Va.
N. B. Divari. 31 Mar 66, 11p NASA-CR-80178, ST-IM-PF-10467
Contract NAS5-9299
Transl. Into English From Astron. Zh. (Ussr), V. 43, No. 1, 1966 P 192-197

Descriptors: *Charged particle, *Interplanetary dust, Cloud, Dust, Earth, Electric, Field, Gegenschein, Geomagnetic, Interplanetary, Light, Lunar, Noctilucence, Particle, Space, Theory, Twilight, U.S.S.R., Zodiac.

For abstract, see STAR 05 02.
N67-12204 HC$3.00 MF$0.65

DETERMINATION OF ABOVE-ATMOSPHERE DIMENSIONS OF METEORITES.
Opredeleniye Doatmosfernykh Razmerov Meteoritov
Volt Technical Corp., Washington, D. C.
A. K. Lavrukhina. 26 Sep 66, 7p NASA-CR-80177, ST-ACH-CR-10513
Contract NAS5-12487
Transl. Into English From Dokl. Akad. Nauk Sssr, Astron. (Moscow), V. 168, No. 6, 1966 P 1275-1278

Descriptors: *Galactic evolution, *Meteorite, *Upper atmosphere, Atmosphere, Cosmic, Density, Distribution, Energy, Evolution, Formation, Galaxy, Interaction, Isotope, Measurement, Nuclear, Radiometry, Ray, Solar, Spatial, System, U.S.S.R., Upper.

For abstract, see STAR 05 02.
N67-12205 HC$3.00 MF$0.65

COMPUTATION OF DEBRIS PROBLEM CAUSED BY ACTIVE SEISMIC SHOTS ON THE LUNAR SURFACE.
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
C. Broder. May 66, 60p NASA-CR-78970, R-197
Contract NAS8-20166

Descriptors: *Chemical explosion, *Lunar surface, *Space debris, Ballistics, Chemical, Computation, Crater, Debris, Density, Distribution, Energy, Equation, Explosion, Hypervelocity, Impact, Lunar, Particle, Seismic, Space, Surface, Velocity.

For abstract, see STAR 05 02.
N67-12235 HC$3.00 MF$0.65

MEASUREMENTS OF THE MAGNETIC FIELD IN THE VICINITY OF THE MOON ON THE AMS LUNA-10.
Izmereniya Magnitnogo Polya V Okresnosti Luny Na Iskusstvennom Sputnike Luna-10
Volt Technical Corp., Washington, D. C.
SH. SHDolginov, N. V. Pushkov, E. G. Yeroshenko, and L. N. Zhuzgov. 31 Oct 66, 7p NASA-CR-79545, ST-PF-LPS-10530
Contract NAS5-12487
Transl. Into English From Dokl. Acad. Nauk Sssr, Geofiz. (Ussr), V. 170, No. 3, 1966 P 574-577

Descriptors: *Lunar magnetic field, *Satellite measurement, Activity, Artificial, Earth, Field, Intensity, Interplanetary, Lunar, Magnetic, Magnetometer, Measurement, Satellite, Surface.

For abstract, see STAR 05 02.
N67-12247 HC$3.00 MF$0.65

EVALUATION DIFFERENCES ON MARS.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
J. B. Pollack, and C. Sagan. 10 Oct 66, 52p
NASA-CR-80110, SAO SPECIAL REPT.-224
Contract NGR-09-015-023

Descriptors: *Mars (planet), *Mars surface, *Space science, Brightness, Dark, Elevation, Frost, Meteorology, Observation, Radar, Science, Space, Surface, Vaporization.

For abstract, see STAR 05 02.
N67-12248 HC$3.00 MF$0.65

SIGNS OF CROSSING BY THE MOON OF THE EARTH'S MAGNETOSPHERE TAIL ACCORDING TO DATA OF CHARGED PARTICLE TRAPS ON THE FIRST ARTIFICIAL SATELLITE OF THE MOON (LUNA-10).
Priznaki Peresecheniya Lunoy Khvota Magnitosfery Zemli Po Dannym Lovushek Zaryazhennykh Chastits Na Pervom Iskusstennom Sputnike Luny
Volt Technical Corp., Washington, D. C.
V. V. Bezrukikh, K. I. Gringauz, M. Z. Khokhlov, L. S. Musatov, and A. P. Remizov. 27 Oct 66, 6p
NASA-CR-80107, ST-PF-LPS-10529
Contract NAS5-12487
Transl. Into English From Dokl. Acad. Nauk Sssr, Geofiz. (Ussr), V. 170, No. 3, 1966 P 570-573

Descriptors: *Charged particle, *Earth-moon system, *Magnetosphere, Charge, Crossed, Data, Earth, Electron, Evidence, Field, Flux, Moon, Particle, Probe, Space, System, Tail, Trap.

For abstract, see STAR 05 02.
N67-12251 HC$3.00 MF$0.65

3C. CELESTIAL MECHANICS

OBSERVATIONS OF GALACTIC AND EXTRA-GALACTIC EMISSION AT 408Mc/s. THE DETERMINATION OF THE ACCURATE POSITIONS OF RADIO SOURCES BY THE LUNAR OCCULTATION TECHNIQUE. OBSERVATIONS OF EMISSION FROM FLARE STARS.
Nuffield Radio Astronomy Labs., Jodrell Bank (England).
For primary bibliographic entry see Field 3B.
AD-644 160 HC$3.00 MF$0.65

THE MOTION OF A SATELLITE OF THE MOON.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
T. L. Felsentreger, G. E. Giacaglia, J. P. Murphy, E. M. Standish, Jr., and C. E. Velez. Jun 66, 151p
NASA-TM-X-55295, X-547-65-218
Revised

Descriptors: *Lunar orbiter, *Motion equation, *Numerical analysis, Analysis, Canonical, Earth, Eccentricity, Equation, Hamiltonian, Inclination, Integration, Lunar, Mathematics, Motion, Numerical, Orbit, Perturbation, Problem, Satellite, Von zeipel method.

For abstract, see STAR 05 02.
N67-11392 HC$3.00 MF$0.65

DETERMINATION OF INTEGRATION CONSTANTS IN THE GENERALIZED PROBLEM OF TWO FIXED CENTERS.
Volt Technical Corp., Washington, D. C.
E. I. Timoshkova. 10 Oct 66, 14p NASA-CR-80142, ST-CM-10522
Contract NAS5-12487
Transl. Into English From Vestn. Leningr. Univ., Ser. Astron. (Leningrad), V. 13, No. 3, 1966 P 113-123

Descriptors: *Elliptic integral, *Fixed point, *Gravitational field, Algebra, Center, Constant, Determination, Earth, Ellipticity, Field, Fixed, Generalization, Gravitational, Integral, Integration, Point, Problem, Two.

For abstract, see STAR 05 02.
N67-12252 HC$3.00 MF$0.65

4. ATMOSPHERIC SCIENCES

4A. ATMOSPHERIC PHYSICS

A PRACTICAL SOLUTION OF THE ATMOSPHERIC DISPERSION PROBLEM.
Physical sciences research papers,
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
George W. Simon. 10 Jan 66, 9p AFCRL-PSRP-265, AFCRL-66-642
Availability: Published in Astronomical Journal v71 n3 p190-4 Apr 1966.

Descriptors: (*Atmospheric refraction, Numerical analysis), (*Atmosphere, Scattering), Tables, Spectra (Visible + ultraviolet), Spectra (Infrared).

The classical equation for refraction by a spherically symmetric atmosphere is solved numerically, with particular emphasis on the wavelength dependence (atmospheric dispersion) of the refraction. The results are presented as a table of coefficients from which one can easily and accurately compute, by desk calculator or electronic computer, the atmospheric dispersion under any atmospheric conditions, between 3000 and 11 000 A. (Author)
AD-643 516 Not available from CFSTI.

SOME RESULTS OF RADAR SOUNDING OF THE TROPOSPHERE AND TROPOPAUSE.
Research translation,
American Meteorological Society, Boston, Mass.
K. S. Zhupakhin. Oct 66, 21p T-R-629
TT-67-60183
Contract AF 19 (628)-3880
Nekotore Rezultaty Radiolokatsionnykh Zondirovanii Troposfery i Tropopauzy, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR), n177 p129-41 1965.

Descriptors: (*Atmospheric sounding, Radar), (*Meteorological radar, Atmospheric sounding), Troposphere, Tropopause, Radiosondes, Weather forecasting, Radar echo areas.

The results of joint radiosonde and radar sounding of the troposphere and tropopause are compared. These were clear-weather soundings made in the fall of 1963.
AD-643 558 HC$3.00 MF$0.65

OPTICAL SOUNDING II. PART II.
Final rept., 16 Jul 65-30 Apr 66,
New York Univ., N. Y. Geophysical Sciences Lab.
E. E. Uthe. Oct 66, 99p TR-66-11
ECOM-03411-F-Pt-2
Contract DA-36-039-AMC-03411 (E)
See also AD-623 513.

Descriptors: (*Atmospheric sounding, *Atmospheric temperature), Spectroscopy, Carbon dioxide, Wave transmission, Water vapor, Absorption.

Atmospheric transmissions are computed for the 15 micron CO2 absorption band. Carbon dioxide absorption is computed using the quasi-random band model (QRBM) with the line positions and strengths as given by Young (1964, corrected 1965). The Lorentz line shape is assumed and the mean half width is determined from the absorption measurements of Burch et el. (1962). The water vapor absorption in this frequency region is computed from an empirical model of Davis and Viezee (1964). The Curtis-Godson approximation is assumed for non-homogeneous vertical atmospheric paths. Frequency interval transmissions are computed for 10/cm increments using a modified triangular response function compatible with QRBM increments of 1/cm. Atmospheric radiation intensities as received at ground level are computed from the integral form of the transfer equation. A criterion is established for determining integration error. The computed spectral intensities are compared with measured intensities. (Author)
AD-643 562 HC$3.00 MF$0.65

INCOHERENT SCATTER FROM PLASMA OSCILLATIONS IN THE IONOSPHERE,
Arecibo Ionospheric Observatory, Puerto Rico.
F. W. Perkins, E. E. Salpeter, and K. P. Yngvesson. 1965, 10p
AFOSR-66-2687
Contract AF 49 (638)-1156
Availability: Published in Electron Density Profiles in Ionosphere and Exposure, Proceedings of the NATO Advanced Study Institute, Finse, Norway Apr 1965.

Descriptors: (*Incoherent scattering, *Ionosphere), (*Plasma oscillations, Ionosphere), Photoelectrons, Nonequilibrium flow, Electron density.

In radar incoherent scatter investigations of the ionosphere, theory predicts that a small amount of power will be returned in a pair of sharp lines separated from the transmitted frequency by the electron plasma frequency. These 'plasma' lines are caused by scattering from longitudinal, electrostatic plasma oscillations. The observation of the plasma-line signal is reported and its large variation in intensity is discussed in terms of a nonequilibrium theory that allows for the presence of energetic photoelectrons. (Author)
AD-643 578 Not available from CFSTI.

ENTRY HEAT TRANSFER AT SUPERORBITAL SPEEDS,
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
For primary bibliographic entry see Field 20M.
AD-643 618 Not available from CFSTI.

ON THE MEASUREMENT OF IONOSPHERIC DRIFTS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. K. Nerovnya, A. A. Kashin, and E. G. Andreev. 7 Dec 66, 8p FTD-HT-66-274
TT-67-60198
Availability: Published in Ob Izmerenii Ionosfernykh Dreifov, unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 3: Fizika Astronomiya (USSR), n1 p121-3 1966.

Descriptors: (*Ionosphere, Drift), (*Ionospheric propagation, Absorption), Measurement, USSR.

Over the years in the Department of Physics of the Atmosphere (Moscow University) two-frequency ionsphere stations have been developed for the investigation of drifts, absorption of radio waves, and non-linear effects. The station there at present is for the investigation of drifts of small-scale nonuniformities. A schematic diagram is given of the station consisting of a transmitter and two receivers operating in the range of 1--15 megacycles. The authors discuss the operation of the station and the types of components used. It is pointed out that 35mm film or highly sensitive movie film, Pf-3, are used in the photorecorder system. Mention is made of the fact that since November of 1964 drift investigation at four obtained for the dependence of the direction and the value for the drift rate in the F region for January 28, 1965 at 1405 hours. (Author)
AD-643 628 HC$3.00 MF$0.65

THE SPECTRA OF LARGE SCALE ATMOSPHERIC FLOW AT 100 mb,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Chen Shou-jun. 8 Dec 66, 14p FTD-HT-66-437
TT-67-60209
Edited trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic), v33 n3 p333-8 1963.

Descriptors: (*Atmospheric motion, Kinetic energy), Geophysics, Stratosphere, Atmospheric temperature, Periodic variations, China.

The spectra of meridional and zonal kinetic energy at 100 mb are computed. The day-to-day variations of ultra-long waves are also studied and discussed. The changes of circulation pattern at 100 mb are mainly due to the variation of waves with wave numbers lower than three. (Author)
AD-643 636 HC$3.00 MF$0.65

LETTERS. SOME PHOTOELECTRIC OBSERVATIONS OF LIGHTNING.
Revised ed.,
Arizona Univ., Tucson. Inst. of Atmospheric Physics.
E. Philip Krider. 17 Mar 66, 4p
Contract Nonr-2173 (06)
Revision of manuscript submitted 10 Feb 66.
Availability: Published in Journal of Geophysical Research v71 n12 p3095-8 Jun 15 1966.

Descriptors: (*Lightning, Photometers), (*Photoelectric effect, Lightning), Electric discharges, Photographic analysis, Atmospheric electricity, Oscilloscopes, Photosensitivity, Clouds.

During the summer of 1965, a calibrated silicon photodiode and an oscilloscope were used as a fast-response lightning photometer covering the visible and near-infrared regions of the spectrum from 0.4 to 1.1 mu. Simultaneous still photographs of the discharge channels were taken to determine how the photoelectric pulse profiles depend on the type of lightning (i.e., cloud-to-ground versus cloud-to-cloud) and the geometry of the channels. These observations represent the first attempt at a photometric study of lightning with correlated photographs of the discharge channels.
AD-643 742 Not available from CFSTI.

THE DIURNAL OSCILLATIONS OF RADON AND THORON AND THEIR DECAY PRODUCTS.
Revised ed.,
Arizona Univ., Tucson. Inst. of Atmospheric Physics.
D. O. Staley. 6 Apr 66, 11p
Contract Nonr-2173 (02)
Revision of manuscript submitted 7 Feb 66.
Availability: Published in Journal of Geophysical Research v71 n14 p3357-67 Jul 15 1966.

Descriptors: (*Natural radioactivity, Diurnal variations), (*Radon, *Decay schemes), Radioactive isotopes, Air, Atmospheric motion, Tracer studies.

Periodic and height-dependent solutions are derived for the disturbances of concentrations of Rn222, Rn220, and their first three decay products in the air above the earth's surface, account being taken of turbulent diffusion and radioactive decay. At the surface, sinusoidal oscillations of Rn222 and Rn220 are assumed, but the concentrations of decay products are required to vanish. At large heights, all concentrations are required to vanish. It is shown that the Rn222 (radon) concentration disturbance is influenced mostly by turbulent diffusion and only slightly by decay. The form of the disturbance is very similar to that of the diurnal oscillation of potential temperature for a constant eddy conductivity. Amplitude decreases exponentially upward and phase propagates upward with constant velocity. Daughter products near the surface are not, by reason of the lower boundary condition, in radioactive equilibrium with Rn222. At sufficiently large heights, however, all daughter products approach radioactive equilibrium with Rn222 by reason of their rapid decay. The height of which radioactive equilibrium becomes a good approximation increases with each successive decay product and ranges from tens to hundreds of meters in numerical examples. (Author)
AD-643 743 Not available from CFSTI.

SEPARATION OF SUBMICRON CONDENSATE PARTICLES IN A VORTEX CHAMBER,

Group 4A — Atmospheric physics

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
Eugene C. Fletcher, George Gyarmathy, and Siegfried H. Hasinger. Nov 66, 122p ARL-66-0218

Descriptors: (*Raindrops, Separation), (*Ice, Separation), Secondary flow, Hilsch tubes, Condensation, Particles, Water vapor, Vaporization, Air, Boundary layer, Humidity.

Experimental results were obtained on the separation of submicron-size particles (water droplets and ice particles) from a carrier gas (air) in 'reversed-flow' swirl chambers. The separation efficiency, with droplets of about 0.3 micron diameter was found to vary between 25% and 90%, depending mainly on the relative humidity of the inlet flow. The low values occurred at low humidities when the droplets were vaporized before they reached the enriched exit; the highest values resulted at highly supersaturated chamber conditions when the particles were prevented from revaporization. In order to facilitate the understanding of the complex phenomena taking place in the chamber, visual observations, optical particle size measurements and, in the exhaust passages, detailed flow investigations were carried out. These studies established a reasonably consistent picture of the flow, condensation, and separation processes in the chamber. (Author)
AD-643 766 HC$3.00 MF$0.65

ANISOTROPIC DIFFUSION OF SOLAR COSMIC RAYS,
Minnesota Univ., Minneapolis. Cosmic Ray Group.
For primary bibliographic entry see Field 3B.
AD-643 863 HC$3.00 MF$0.65

TECHNIQUES FOR THE MEASUREMENT OF AIRGLOW AND AURORA IN THE INFRARED.
Utah State Univ., Logan. Electro-Dynamics Lab.
For primary bibliographic entry see Field 20F.
AD-643 911 HC$3.00 MF$0.65

HIGH RESOLUTION ULTRAVIOLET SPECTRAL STUDY OF THE AURORA IN ASSOCIATION WITH SATELLITE EXPERIMENT.
Final rept.,
Stanford Research Inst., Menlo Park, Calif.
Robert A. Young. 24 Oct 66, 23p
DASA-1874
Contract DA-49-146-XZ-356

Descriptors: (*Aurorae, Ultraviolet equipment), (*Airglow, Ultraviolet equipment), Spectrum analyzers, Ultraviolet spectroscopy, Upper atmosphere, Aircraft, High altitude, Instrumentation, Image tubes, Spectra (Visible + Ultraviolet), Moon, Cirrus clouds, Cloud cover.

Two spectrometers have been adapted for use in aircraft-based observations of auroral events, airglow, or high altitude nuclear tests. The instruments feature image tube detection and wide spectral coverage. The instrumentation and trials in aircraft and on the ground are described and illustrated.
AD-643 918 HC$3.00 MF$0.65

MEASUREMENT OF STICKING PROBABILITY AND RECOMINATION COEFFICIENT OF ELECTRONS IN GASSES BY THE METHODS OF PENETRATING RADIATIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20I.
AD-643 957 HC$3.00 MF$0.65

A PRELIMINARY STUDY OF THE CHARACTERISTICS AND EVOLUTION OF MEAN MONTHLY CIRCULATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Shao-wo Wang. 13 Oct 66, 30p FTD-HT-66-400 TT-67-60268
Edited trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v33 n3 p361-74 1963.

Descriptors: (*Atmospheric motion, Periodic variations), (*Weather forecasting, Atmospheric motion), Air mass analysis, Climatology, Troposphere, Sunspots, Meteorological phenomena, Statistical functions.

Owing to the accumulation of observation results, it is possible, at the present time, to make a complete study of a relatively long period circulation pattern in the temperate latitude belt of the troposphere. Hence, using the mean monthly 500 mb charts in the northern hemisphere of the last 10 years (1951 to 1960), we have made some analyses of the atmospheric flow characteristics from different angles and emphasizing an investigation of its long range variation pattern.
AD-643 972 HC$3.00 MF$0.65

THE BEHAVIOR OF RADIATION BELTS AND ANOMALOUS ABSORPTION OF COSMIC RADIO NOISE IN THE ZONE OF THE POLAR AURORA DURING THE MAGNETIC STORMS OF 12-14 FEBRUARY AND 20-21 FEBRUARY 1964,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
S. N. Vernov, and V. M. Driatskii. 12 Sep 66, 16p FTD-HT-66-304
TT-67-60304
Unedited rough draft trans. of Geomagnetizm i Aeronomiya (USSR), v6 n1 p3-10 1966.

Descriptors: (*Extraterrestrial radio waves, Absorption), (*Magnetic storms, Extraterrestrial radio waves), Aurorae, Polar regions, Upper atmosphere, Cosmic rays, Magnetic fields, Radiation measurement systems, Terrestrial magnetism, Electron capture, Bremsstrahlung, Radio waves, Electromagnetic waves.

The behavior of the external radiation belt and also the case of anomalous absorption of cosmic radio noise in the zone of the polar aurora during the magnetic storms of 12-14 and 20-21 February 1964 are studied. The behavior of the external radiation and belt anomalous absorption of cosmic radio noise with different phases of magnetic storms are compared.
AD-644 063 HC$3.00 MF$0.65

CONSTANT PARAMETER STEADY-STATE DIFFUSION. ANALYTIC SOLUTIONS IN TWO AND THREE DIMENSIONS.
Technical meno.,
Pacific Missile Range, Point Mugu, Calif.
C. J. Thorne, and E. D. Simmons. 30 Sep 66, 41p PMR-TM-66-7

Descriptors: (*Diffusion, *Mathematical models), (*Air pollution, Diffusion), Two-dimensional flow, Three-dimensional flow, Absorption, Gases.

Analytic solutions are presented for two- and three-dimensional steady-state diffusion problems with constant coefficients. Assumptions of the mathematical model used are: (1) source concentration is known in the source plane, (2) rate of absorption of material into the surface or deposit of material upon the surface is known and is proportional to concentration, (3) concentration at any point is steady state (i.e., independent of time), (4) wind velocity is constant, and (5) the coefficient of diffusion (K) is constant. A general steady-state two-dimensional solution is determined for an arbitrary source concentration function and is given in terms of convolution integrals. The solution is given for sectionally linear discontinuous source concentration functions in terms of dimensionless parameters. A method is developed to extend the two-dimensional results of parts 1 and 2 to three dimensions. Solutions are given for three-dimensional planar source concentration functions symmetric in the plane perpendicular to the wind. (Author)
AD-644 151 HC$3.00 MF$0.65

POSITIVE ION COMPOSITION AND DENSITY IN THE LOWER E-REGION, FROM 87 TO 114 KILOMETERS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
H. C. Brinton, M. W. Pharo, III, C. R. Smith, and H. A. Taylor, Jr.. Jun 66, 23p NASA-TM-X-55582, X-621-66-266

Descriptors: *E layer, *Ion density, *Mass spectrometer, Ceramic, Composition, Current, Density, Instrumentation, Ion, Mass, Nitric, Oxide, Payload, Positive, Spectrometer.

For abstract, see STAR 05 02.
N67-11363 HC$3.00 MF$0.65

THE NEUTRAL SHEET IN THE GEOMAGNETIC TAIL - ITS MOTION, EQUIVALENT CURRENTS, AND FIELD LINE CONNECTION THROUGH IT.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
N. F. Ness, and T. W. Speiser. Jun 66, 38p NASA-TM-X-55586, X-612-66-290

Descriptors: *Current sheet, *Magnetic field, Connection, Current, Earth, Equivalent, Field, Geomagnetic, Imp, Interplanetary, Line, Magnetic, Motion, Neutral, Plasma, Satellite, Sheet, Tail.

For abstract, see STAR 05 02.
N67-11364 HC$3.00 MF$0.65

THERMAL PLASMA MEASUREMENTS WITHIN THE MAGNETOSPHERE.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
E. J. Maier, and G. P. Serbu. Jul 66, 14p NASA-TM-X-55591, X-615-66-328

Descriptors: *Imp, *Magnetosphere, *Satellite measurement, *Thermal plasma, Boltzmann distribution, Density, Distribution, Electron, Energy, Gas, Ion, Ionosphere, Maxwell distribution, Measurement, Plasma, Satellite, Temperature, Thermal.

For abstract, see STAR 05 02.
N67-11369 HC$3.00 MF$0.65

GLOBAL BEHAVIOR OF THE IONOSPHERE AT 1,000 KILOMETERS ALTITUDE.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
L. H. Brace, H. G. Mayr, and B. M. Reddy. Aug 66, 48p NASA-TM-X-55599, X-621-66-362

Descriptors: *Electron temperature, *Ionosphere, *Satellite measurement, Concentration, Conduction, Cooling, Electron, Electrostatic, Equilibrium, Explorer xxii satellite, Measurement, Probe, Satellite, Temperature, Thermal.

For abstract, see STAR 05 02.
N67-11374 HC$3.00 MF$0.65

OBSERVATIONS OF THE SOLAR WIND INTERACTION WITH THE GEOMAGNETIC FIELD - CONDITIONS QUIET.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
N. F. Ness. Aug 66, 58p NASA-TM-X-55605, X-612-66-381

Descriptors: *Geomagnetic field, *Satellite measurement, *Solar wind, Boundary, Emission, Field, Flux, Geomagnetic, Magnetosphere, Measurement, Neutral, Particle, Plasma, Satellite, Sheet, Shock, Solar, Tail, Wave, Wind.

For abstract, see STAR 05 02.
N67-11378 HC$3.00 MF$0.65

LONGITUDE DEPENDENCE OF GEOMAGNETICALLY TRAPPED ELECTRONS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. V. Herod, J. G. Roederer, and J. A. Welch. Aug 66, 63p NASA-TM-X-55606, X-641-66-382
Presented At The Inter- Union Symp. On Solar-terrest. Phys., Belgrade, 28 Aug. - 2 Sep. 1966

Descriptors: *Fokker-planck equation, *Geomagnetically trapped particle, *Longitude, Drift, Electron, Energy, Field, Geomagnetic, Intensity, Ionization, Loss, Mirror, Particle, Point, Scattering, Time, Trap.

For abstract, see STAR 05 02.
N67-11379 HC$3.00 MF$0.65

HIGH ALTITUDE BALLOON-TOP COLLECTIONS OF COSMIC DUST.
Dudley Observatory, Albany, N. Y.
R. E. Coon, D. S. Hallgren, and C. L. Hemenway. 1966, 12p NASA-CR-79623
Grant NSG-155
Presented At The Cospar Meeting, Vienna, May 1966

Descriptors: *Balloon sounding, *Cosmic dust, *Upper atmosphere, Analysis, Atmosphere, Balloon, Chemical, Cosmic, Crystal, Dust, Flux, High altitude, Particle, Sounding, Structure, Upper.

For abstract, see STAR 05 02.
N67-11696 HC$3.00 MF$0.65

THERMAL CONDUCTION AND ION TEMPERATURES IN THE IONOSPHERE.
Pennsylvania State Univ., University Park. Dept. Of Electrical Engineering.
P. M. Banks. 10 Oct 66, 18p NASA-CR-79534, SR-281
Grant NSG-134-61

Descriptors: *Energy equation, *Ion temperature, *Thermoconductivity, Atom, Balance, Cooling, Density, Electron, Energy, Equation, Gas, Helium, Hydrogen, Ion, Ionosphere, Oxygen, Temperature.

For abstract, see STAR 05 02.
N67-11724 HC$3.00 MF$0.65

THE TEMPERATURE COUPLING OF IONS IN THE IONOSPHERE.
Pennsylvania State Univ., University Park. Dept. Of Electrical Engineering.
P. M. Banks. 20 Oct 66, 37p NASA-CR-79492, SR-282
Grant NSG-134-61

Descriptors: *Charged particle, *Hydrogen ion, *Ion temperature, *Upper atmosphere, Atmosphere, Charge, Coupling, Electron, Energy, Equation, Gas, Helium, Hydrogen, Ion, Model, Oxygen, Particle, Temperature, Upper.

For abstract, see STAR 05 02.
N67-11726 HC$3.00 MF$0.65

IONOSPHERIC E-REGION IRREGULARITIES PRODUCED BY NON-LINEAR COUPLING OF UNSTABLE PLASMA WAVES.
National Bureau Of Standards, Washington, D. C.
J. P. Dougherty, and D. T. Farley. 1966, 19p NASA-CR-79926
NASA ORDER R-83
Submitted For Publication

Descriptors: *E layer, *Ionospheric irregularity, *Plasma wave, *Wave scattering, Coupling, Echo, Frequency, Instability, Ionospheric, Irregularity, Nonlinear, Plasma, Scattering, Theory, Very high, Wave.

For abstract, see STAR 05 02.
N67-11856 HC$3.00 MF$0.65

CHARACTERIZATION OF RE-ENTRY PLASMAS.
Caracterisation Des Plasmas De Rentree
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
J. Dorey, and C. Veret. 1966, 25p TP-364/1966/ In French, English Summary Presented At The 5th Congr. Of The Intern. Council Of The Aeron. Sci., London, 12-16 Sep. 1966

Descriptors: *Atmospheric entry, *Plasma radiation, *Wave interaction, Atmospheric, Band, Characterization, Derivation, Electron, Energy, Entry, Equation, Exchange, Flow, Hypersonic, Interaction, Ionization, Layer, Low, Optical, Plasma, Radiation, Reaction, Recombination, Reentry, Wave.

For abstract, see STAR 05 02.
N67-11869 HC$3.00 MF$0.65

A COMPARISON OF FPS-16 AND GMD-1 MEASUREMENTS AND METHODS FOR PROCESSING WIND DATA. PHASE II - ANALYSIS OF TIME VARIABILITY OF ATMOSPHERIC PARAMETERS FINAL REPORT.
Pennsylvania State Univ., University Park.
E. F. Danielsen, and R. T. Duquet. 28 Nov 66, 66p NASA-CR-61158
Contract NAS8-11145

Descriptors: *Atmospheric circulation, *Radiosonde, *Tracking radar, *Wind velocity measurement, Ascent, Atmospheric, Balloon, Circulation, Comparison, Computation, Data, Hodograph, Machine, Measurement, Meteorology, Method, Parameter, Processing, Temperature, Test, Velocity, Wind.

For abstract, see STAR 05 02.
N67-11984 HC$3.00 MF$0.65

ATMOSPHERIC DENSITY MODELS AND OBSERVATIONS STATUS REPORT.
Geophysics Corp. Of America, Bedford, Mass. Technology Div.
R. A. Minzner. Feb 66, 35p NASA-CR-79307, GCA-66-5-N
Contract NASW-1225

Descriptors: *Atmospheric density, *Scale model, Altitude, Distribution, Diurnal, High altitude, Low altitude, Measurement, Meteorology, Observation, Profile, Satellite, Temperature, Transition, Variation.

For abstract, see STAR 05 02.
N67-12226 HC$3.00 MF$0.65

4B. METEOROLOGY

COMPUTATION OF A STORM SURGE AT BARROW, ALASKA.
Master's thesis,
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
Pedro J. Schafer. 15 Dec 65, 24p TR-22, Contrib-115
Contract Nonr-477 (24)
Availability: Published in Archivfur Meteorologie, Geophysik und Bioklimatologie SA: Meteorologie un und Geophysik v15 p3-4 p372-93 1966.

Descriptors: (*Marine meteorology, Storms), (*Storms, Alaska), Seacoast, Cyclones, Ocean waves, Atmospheric motion, Weather forecasting, Meteorological charts, Mathematical analysis, Wind, Stresses, Programming (Computers).

The rise of the sea level during a storm surge at the coast of northern Alaska is computed by a method of numerical integration originally developed for the North Sea. Based on the most likely synoptic analysis of the storm cyclone over the Arctic Ocean, pressure gradients and wind stresses, as well as their variations with time, are obtained by grid points. The respective values at the open-sea boundary of the grid are also taken as time variables. The numerical integration (by IBM 709) yields various curves for the changes of water level at the coast which are compared with actual observations. The computed fields of water transport are critically examined in view of the general character of the cyclone and the given distribution of water depth. The agreement between observed and computed heights of the storm surge is satisfactory. (Author)
AD-643 460 Not available from CFSTI.

APPLICATION OF MICROBAROMETRIC LEVELING DURING LARGE SCALE GRAVIMETRIC SURVEY IN MOUNTAIN-TAIGA TERRAIN.
Technical translation,
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
A. K. Gordun, I. N. Kadyrov, L. L. Lyakhov, and G. A. Solovev. Nov 66, 9p ACIC-TC-1132
TT-67-60178
Primenenie Mikrobaronivelirovaniya pri Krupnomaschtabnoi Gravimetricheskoi semke v Gorno-Taezhnoi Mestnosti. trans. of Izvestiya Vyssikh Uchebnykh Zavedenii. Geologiya i Razvedka (USSR), v9 n4 p136-8 1966.

Descriptors: (*Barometric pressure, Measurement), (*Atmospheric temperature, Measurement), Gravity, Terrain, Mountains, Altitude, Micrometeorology, Atmospheric motion, USSR.

The time from sunrise till 9-10 a.m. on the northern slopes and till 11-12 a.m. on the southern ones, as well as after 15-16 p.m., is most favorable for field observations. To reduce the distorting influence of pressure-and temperature-microfluctuations several readings should be taken on the instrument at one-minute intervals. Five-Seven readings should be taken at the fundamental points. Work should be discontinued during the periods of accelerated pressure changes, exceeding 0.8-1 torus/hour. In this case, moreover, an error of 1 min in time determination leads to errors of up to 0.5m. The temperature curves should be averaged, without taking into account the single 'splashes'. Special attention should be paid to the determination of the value of the barometric degree. (Author)
AD-643 481 HC$3.00 MF$0.65

BAROMETRIC LEVELING METHOD IN GRAVIMETRIC SURVEY WITH ISO-ANOMALIC LINES SEPARATED BY 0.5 AND 1.0 MGAL INTERVALS.
Technical translation,
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
I. N. Kulakov. Nov 66, 16p ACIC-TC-1116
TT-67-60177
Metodika Barometricheskogo Nivelirovaniya pri Gravimetricheskikh Semkakh s Secheniem Izoanomal Cherez 0.5 i 1.0 MGL, trans. of Razvedochnaya Geofizika (USSR), n7 p107-17 1965.

Group 4B—Meteorology

Descriptors: (*Barometric pressure, Measurement), Gravity, Altitude, Barometers, Atmospheric temperature, Weather stations, USSR.

The conclusion was drawn that obtaining the elevation marks with a mean quadratic error of plus or minus 0.5m is possible only by the method with reference to one station. For the elevation control of one-and two milligal gravimetric surveys the method with reference to one or several stations may be used. (Author)
AD-643 485 HC$3.00 MF$0.65

MEAN WIND PROFILES 1956-1959 HAWAII AND THE CENTRAL PACIFIC. PART III.
Final rept.,
Hawaii Inst. of Geophysics, Honolulu.
Hitoye M. Kakugawa, and Carl W. Adams. 15 Aug 66, 173p HIG-66-13

Descriptors: (*Marine meteorology, Wind), (*Hawaii, Wind), (*Pacific Ocean islands, Wind), (*Wind, Statistical analysis), Graphics, Meteorological charts, Periodic variations.

Mean-resultant wind profiles are presented by individual months averaged throughout the period 1956 through 1959 and by alternate year groupings for certain stations. Mean-resultant wind component percentage profiles are averaged on a seasonal basis for the entire period and by alternate year groupings for certain stations. (Author)
AD-643 542 HC$3.00 MF$0.65

RELATION BETWEEN MEAN ANNUAL AIR AND GROUND TEMPERATURES IN THE PERMAFROST REGION OF CANADA.
National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
For primary bibliographic entry see Field 8L.
AD-643 611 Not available from CFSTI.

RADAR EQUIPMENT FOR POLARIZATION INVESTIGATIONS OF CLOUDS AND PRECIPITATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
S. P. Morgunov, G. P. Trifonov, and A. B. Shupyatskii. 21 Nov 66, 14p FTD-MT-65-303
TT-64-51933
Radiolokatsionnaya Apparatura dlya Polarizatsionnykh Issledovanii Oblakov i Osadkov, edited machine trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR), n48 p106-11 1963.

Descriptors: (*Clouds, Polarization), (*Atmospheric precipitation, Polarization), Meteorological radar, Radar echo areas, Radar antennas, Radar signals, Radar equipment, Meteorological parameters, Meteorological phenomena.

Polarization methods for the analysis of echoes from clouds and precipitation have been developed recently. This article describes a radar apparatus which can be used to investigate the polarization characteristics of echoes from clouds and precipitation. The Laboratoriya radiolokatsii Tsentral'noy aerologicheskoy observatorii (Radar Laboratory of the Central Aerological Observatory) has developed a two-antenna radar set with a fixed beam and variable polarization of the signal. The system can transmit and receive echoes with linear, circular, or elliptical polarization. The block diagram of the set is shown in Fig. 1 of the Enclosure. The outfit is based on a modern 3-cm high-potential radar set.
AD-643 641 HC$3.00 MF$0.65

THE ACCURACY OF MINIATURE BEAD THERMISTORS IN THE MEASUREMENT OF UPPER AIR TEMPERATURES.
Interim rept.,
Massachusetts Inst. of Tech., Cambridge. Dept. of Meteorology.
Donald C. Thompson. 1 Oct 66, 266p Scientific-1 AFCRL-66-773
Contract AF 19(628)-4165

Descriptors: (*Thermistors, Errors), (*Atmospheric temperature, Thermistors), Measurement, Meteorological instruments, Sounding rockets, Upper atmosphere, Solar radiation.

A laboratory study was made of the errors of miniature bead thermistors of 5, 10, and 15 mils nominal diameter when used for the measurement of atmospheric temperature. Although the study was primarily concerned with the errors of the thermistors when used in Meteorological rocket soundings between about 70 km and 30 km altitude the results are also valid for other applications of these thermistors to all altitudes down to sea level. Several distinct sources of error are present, and these have each been discussed and estimates of their magnitude made from laboratory tests. In general, all errors increase rapidly above about 50 km. Certain items which had not been fully considered in previous discussions of this problem have been shown to be highly significant. In particular it is found that the lead wires play an important part in determining thermistor response, particularly at high altitude, and that the temperature rise of the thermistor due to solar radiation is strongly dependent on the radiation absorbed by the lead wires as well as by the bead proper. (Author)
AD-643 684 HC$3.00 MF$0.65

SIMULATION OF WIND FIELDS OVER POINT ARGUELLO, CALIFORNIA, BY WIND-TUNNEL FLOW OVER A TOPOGRAPHIC MODEL.
Final technical rept.,
Colorado State Univ., Fort Collins. Fluid Dynamics and Diffusion Lab.
J. E. Cermak, and Jon Peterka. Nov 66, 88p CER65JEC-JAP64
Contract N123 (61756)34361A

Descriptors: (*Wind, Simulation), Terrain models, Atmosphere models, Flow fields, Atmospheric temperature, Velocity, Laminar flow, Turbulence, Convection (Atmospheric), Wind tunnels, California.

Stably stratified flow over a 1:12,000 scale model at Point Arguello, California was studied. Mean temperature, mean velocity and mean concentration distributions obtained for the laboratory flow were compared with available field data collected at the site. These comparisons revealed that the geometrical, dynamic and thermal similarity were sufficiently achieved to give similar mean flow patterns, temperature distributions and concentration decay rates for diffusing tracers. The data revealed that a laminar laboratory flow may be used to simulate a turbulent field flow under conditions of stable thermal stratification and complex terrain. In such flow conditions, diffusion is dominated by convective dispersion. (Author)
AD-643 689 HC$3.00 MF$0.65

CORRELATION OF SOME LABORATORY EXPERIMENTS IN TWO-PHASE FLOW WITH PHENOMENA AT THE AIR-SEA INTERFACE,
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 8C.
AD-643 767 HC$3.00 MF$0.65

THE ELECTROMAGNETIC PROPAGATION RANGE FACILITY AT THE BALLISTIC RESEARCH LABORATORIES,
Ballistic Research Labs., Aberdeen Proving Ground, Md.
For primary bibliographic entry see Field 14B.
AD-643 770 HC$3.00 MF$0.65

SPECTRAL TRANSPARENCY AND MICROSTRUCTURE OF ARTIFICIAL FOG,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7D.
AD-643 900 HC$3.00 MF$0.65

A PRELIMINARY STUDY OF THE CHARACTERISTICS AND EVOLUTION OF MEAN MONTHLY CIRCULATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 4A.
AD-643 972 HC$3.00 MF$0.65

LAGRANGIAN DYNAMICS AND LOW LATITUDE WEATHER,
Hawaii Inst. of Geophysics, Honolulu.
A. H. Gordon, and R. C. Taylor. Aug 66, 34p HIG-66-12, Rept. no. 1
Contract AF 19(628)-3860, Grant NSF-GA-386
Rept. on International Indian Ocean Expedition Meteorology Program.

Descriptors: (*Wind, Equations of motion), (*Atmospheric motion, Convergence), Coriolis effect, Meteorological phenomena, Pacific Ocean, Indian Ocean, Air mass analysis, Meteorological satellites, Tropical regions, Differential equations.

The differential equations of horizontal motion of the atmosphere with variable Coriolis parameter have been integrated numerically for both frictionless flow and flow which incorporates a coefficient of surface frictional resistance, to obtain trajectories of air parcels which move through observed meridional pressure gradient profiles within the tropics. Convergence patterns have been computed from the trajectories of adjacent air parcels which are initially at a fixed distance apart. Good agreement has been obtained between the convergence computed by following the flow and the rainfall and cloudiness observed by satellites and surface weather observations for case examples on both synoptic and climatological time scales in the South Central Pacific and the Indian Ocean.
AD-644 022 HC$3.00 MF$0.65

INSPECTION OF A METEOROLOGICAL NETWORK,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
D. F. Nezdyurov. 6 Jun 66, 365p FTD-MT-65-230
TT-67-60325
Edited machine trans. of mono. Inspektsiya Meteorologicheskoi Seti, Leningrad, 1955 316p.

Descriptors: (*Weather stations, Standards), Maintenance, Meteorological parameters, USSR, Meteorological instruments.
Identifiers: Inspection.

The book is an aid in which the organizational methods and procedures of hydrometeorologic stations and posts are systematized, and procedures for checking the performance of basic meteorological observations and the operational service of various areas of the national economy are outlined. It gives brief instructions for checking additional hydrometeorologic observations, e.g., aerologic, actinometric, and agrometeorologic, in enough detail, necessary for an inspector of the hydrometeorological service. There is a brief reference section on the tasks that an inspector must perform at hydrometeorological stations, and information that is necessary for carrying out urgent repair of instruments and equipment. (Author)
AD-644 111 HC$3.00 MF$0.65

PRECIPITATION WATER CONTENT METER.
Final rept., 5 Feb 62-4 Aug 63,
New York Univ., N. Y. Research Div.
Alan M. Nathan, and Leon Bennet. Jun 66, 53p
Rept. no. 1004

Grants DA-SIG-36-039-62-G20, DA-SIG-36-039-63-G3

Descriptors: (*Meteorological instruments, *Raindrops), Atmospheric precipitation, Water, Rain, Airborne, Capacitors, Collecting methods.

A project to develop a means of measuring only the 'precipitation water content' from an aircraft flying through rain resulted in a new type of meteorological sensor. The instrument is basically an air gap capacitor which utilizes centrifugal force to drive all captured water droplets out between the capacitor plates. Because of the high dielectric constant of water, large changes in capacity are observed as a function of water input rate. The sensor has a response time of less than one second and is self-clearing. In the contemplated airborne application, where only large drops were desired (no cloud droplets), aerodynamic sorting is used to shunt aside all smaller drops from the intake. The aerodynamic filtering would be accomplished by means of a specially shaped wing tip-tank which would house the sensor. The tip-tank shape was empirically arrived at after much testing in a specialized wind-rain tunnel constructed for the purpose. Collection efficiency and prototype sensor calibration data are presented. The basic sensor may also have applications to cloud liquid water content measurement problems and to the measurement of instantaneous rainfall rate. (Author)
AD-644-122 HC$3.00 MF$0.65

AN ATLAS OF STRATOSPHERIC MEAN ISOTHERMS DERIVED FROM TIROS VII OBSERVATIONS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. S. Kennedy. Jul 66, 85p NASA-TM-X-55587, X-622-66-307

Descriptors: *Isotherm, *Stratosphere, *Tiros vii satellite, Degradation, Emission, Mapping, Meteorology, Pattern, Radiometer, Region, Resolution, Scanning, Spectral, Temperature, Thermal.

For abstract, see STAR 05 02.
N67-11365 HC$3.00 MF$0.65

AN EXPERIMENT DESIGNED TO DETERMINE THE DIURNAL TEMPERATURE AND WIND VARIATION AND TO DETECT POSSIBLE ERRORS IN ROCKETSONDE TEMPERATURE MEASUREMENTS IN THE UPPER STRATOSPHERE.
Weather Bureau, Silver Spring, Md.
F. G. Finger, and H. M. Woolf. Nov 66, 22p
NASA-TM-X-1298
Sponsored By Nasa

Descriptors: *Diurnal variation, *Meteorological rocket, *Rocket sounding, *Temperature measurement, *Wind variation, Detection, Diurnal, Error, Experiment, Instrumentation, Measurement, Meteorology, Profile, Rocket, Sounding, Stratosphere, Temperature, Upper, Variation, Wind.

For abstract, see STAR 05 02.
N67-11816 HC$3.00 MF$0.65

OBSERVATIONS OF RADIOACTIVITY, 1965.
Finnish Meteorological Office, Helsinki.
For primary bibliographic entry see Field 18H.
For abstract, see STAR 05 02.
N67-11870 HC$3.00 MF$0.65

EFFECT OF THE RING CURRENT ON THE DISTRIBUTION OF UNBOUND PARTICLES IN THE MAGNETOSPHERE.
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
P. F. Mc Donald. Jun 66, 53p NASA-CR-78971, R-204
Contract NAS8-20166

Descriptors: *Current sheet, *Magnetosphere, *Ring current, *Trapped particle, Approximation, Belt, Cosmic, Current, Flux, Liouville theorem, Particle, Proton, Radiation, Ray, Ring, Sheet, Solar, Stoermer method, Trapping.

For abstract, see STAR 05 02.
N67-12234 HC$3.00 MF$0.65

EXPLORER 12 MEASUREMENTS OF THE DISTORTION OF THE GEOMAGNETIC FIELD BY THE SOLAR WIND.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
L. J. Cahill, Jr., and G. D. Mead. Nov 66, 29p
NASA-TM-X-55622, X-640-66-527
Submitted For Publication

Descriptors: *Explorer xii satellite, *Geomagnetic field, *Satellite measurement, *Solar wind, Comparison, Data, Distortion, Field, Geomagnetic, Magnetometer, Magnetosphere, Measurement, Model, Quiet, Satellite, Solar, Theoretical, Time, Wind.

For abstract, see STAR 05 02.
N67-12274 HC$3.00 MF$0.65

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. ADMINISTRATION AND MANAGEMENT

COST ANALYSIS FOR PLANNING-PROGRAMMING-BUDGETING COST-BENEFIT STUDIES.
RAND Corp., Santa Monica, Calif.
J. D. McCullough. Nov 66, 64p P-3479
Presented at a series of three-week seminars on 'Planning, Programming, and Budgeting' which are being conducted by the Office of Career Development, U. S. Civil Service Commission, in cooperation with the University of Maryland.

Descriptors: (*Cost effectiveness, Management engineering), (*Management engineering, Budgets), Analysis, Management planning, Operations research, Management control systems, Costs, Decision making.

The concepts, principles, and the general approach of systems cost analysis in support of cost-benefit studies are reviewed. The role of costs was considered both in individual system analysis and within the broader context of program analysis. This description of resource analysis was intended primarily for the users of cost estimates, as opposed to cost analysts. Users of cost estimates must face the critical task of judging cost estimates and evaluating their suitability and quality. The intent of this discussion was to improve the ability of those involved in the conduct of cost-benefit studies in non-defense agencies to appreciate the role of costing, to understand the limitations of cost analysis, and to establish adequate guidelines for the costing work done in support of these studies.
AD-643 472 HC$3.00 MF$0.65

ON A SPECIAL CLASS OF CONSTRAINED GENERALIZED MEDIAN PROBLEMS.
Northwestern Univ., Evanston, Ill. Information-Processing and Control Systems Lab.
For primary bibliographic entry see Field 12B.
AD-643 557 HC$3.00 MF$0.65

FOREIGN SCIENCE BULLETIN, VOL. 2, NO. 11.
Library of Congress, Washington, D. C. Aerospace Technology Div.
Nov 66, 81p
A monthly review of selected foreign scientific and technical literature.

Descriptors: (*Computers, Reliability), (*Semiconductors, *Crystal lattice defects), Seismology, Lasers, Lunar surface vehicles, Aerospace planes, Heat shields, Crystal growth, Superconductors, Instrumentation, Geology, Symposia, Space biology, Fog, USSR.

Contents. Full-length papers: Soviet computer reliability; Nonstoichiometric gallium and indium chalcogenides of the A2 (III)B3 (VI) type. Science and technology notes: Seismic-wave modeling in the USSR; Trends in Soviet geoacoustics; Use of ultrasonics in studying the stratification and elastic-wave velocity in ocean-bottom sediments; A ruby maser operating at 40K; Development of a mobile automatic lunar station; Soviet winged, airbreathing aerospace transporter doctrine; The chemistry of semiconductors;--Heat shield efficiency of phenolics; Thermal factors in the growth of fluorite crystals. Conferences: Conference on superconductors; Bionics and instrument manufacture; Third all-union conference on physics of electronic and atomic collisions; Symposium on Deep-seated processes; Moscow engineering physics institute scientific conference. Science personalities; V. L. Ginzburg. Book reviews.
AD-643 780 HC$3.00 MF$0.65

TRAINING EQUIPMENT AND BUILDING AMORTIZATION STUDY.
Final rept.,
Naval Personnel Program Support Activity, Washington, D. C. Personnel Research Lab.
Burton J. Goodyear. Jan 66, 71p WRM-66-29

Descriptors: (*Naval training, Costs), (*Training devices, Costs), Navy budgets, Money, Management engineering, Buildings, Naval personnel, Officer personnel, Feasibility studies, Department of Defense.
Identifiers: Amortization.

This report discusses the feasibility of including amortization of building and expensive training equipment in the computation of BuPers training costs. The cost of training is one of the major elements involved in the computation of personnel costs for officers and enlisted men. Training costs as presently computed may be considered as only partial costs because these amortization factors are not included. The training cost reporting system of several schools has been studied. Data necessary to compute the amortization factors were generally available to the schools. However, a one time effort would be required to adequately prepare records to facilitate access to the needed data.
AD-643 845 HC$3.00 MF$0.65

PLANNING AND BUDGETING IN A MULTI-PHASE R AND D PROCESS.
Research rept.,
Carnegie Inst. of Tech., Pittsburgh, Pa. Graduate School of Industrial Administration.
R. G. Brandenburg, and A. Stedry. Nov 66, 44p RR-87
Contract Nonr-760 (24)

Descriptors: (*Research program administration, *Management planning), (*Budgets, Research program administration), Search theory, Decision making, Multiple operation.

An attempt is made to develop a model of the research and development process. The focus is on the selection of both research and development projects for investment of research funds. A 'quasi-rational' fund allocation process is assumed wherein the allocation of funds among proposed projects is made by an integer programming technique but the development of the list of projects which are candidates for receipt of funds is assumed to be the result of an ancillary heuristic pro-

cess. The allocation model is not intended as a firm prescription for behavior but rather as a device to gain insight into the project selection process. (Author)
AD-643 867 HC$3.00 MF$0.65

THE EV-80-3 ELECTRONIC COMPUTER AND ITS USE IN PLANNING-ACCOUNTING WORK,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 9B.
AD-643 897 HC$3.00 MF$0.65

RESOURCE ALLOCATION UNDER UNCERTAINTY AND DEMAND INTERDEPENDENCE,
California Univ., Los Angeles. Western Management Science Inst.
For primary bibliographic entry see Field 5C.
AD-643 904 Not available from CFSTI.

ECONOMIC PLANNING AND THE COST OF THINKING,
California Univ., Los Angeles. Western Management Science Inst.
For primary bibliographic entry see Field 5C.
AD-643 905 Not available from CFSTI.

A CONCEPT FOR PROGRESS MANAGEMENT,
Office of Naval Research, Washington, D. C. Naval Analysis Group.
Robert J. Massey. 25 May 66, 175p

Descriptors: (*Management engineering, Research program administration), (*Cost effectiveness, Management engineering), Decision making, Quality control, Operations research, Economics, Reliability, Systems engineering.

Outlines a program for building into an ongoing organization a capability for self-controlled, self-driven innovation through which it can evolve into an ever less imperfect instrument of its mission. A program for progressive development of successive stages of improved progress-management capability is described, along with supporting rationale underlying mechanics. The fully-developed system provides ability to: (1) Define long-range organizational self-improvement objectives through a process which involves (a) application of economic choice to selection of progress objectives based on explicit and documented assumptions, and (b) reduction of uncertainty and refinement of assumptions via RAND Delphi technique and R and D; (2) identify, analyze, structure and document problems barring attainment of objectives; (3) apply most appropriate resource -- management initiative, management technical assistance, R and D, or capital investment -- to solution of these problems, and (4) select R and D problems on basis of return on investment--expected value of payoff over cost to the Command.
AD-643 942 HC$3.00 MF$0.65

GRAPHICAL PERT ANALOG SHOP SCHEDULING FOR PUBLIC WORKS DEPARTMENT,
Pacific Missile Range, Point Mugu, Calif.
For primary bibliographic entry see Field 5I.
AD-643 986 HC$3.00 MF$0.65

RESEARCH PROGRAM ON THE MANAGEMENT OF SCIENCE AND TECHNOLOGY ANNUAL REPORT, 1964 - 1965.
Massachusetts Inst. Of Tech., Cambridge. Alfred P. Sloan School Of Management.
D. G. Marquis. Jul 65, 58p NASA-CR-79701
Grant NSG-235

Descriptors: *Program management, *Research project, Education, Management, Planning, Problem, Program, Project, Research, Science, Solution, Technology.

For abstract, see STAR 05 02.
N67-11339 HC$3.00 MF$0.65

THE NASA WESTERN UNIVERSITY CONFERENCE SUMMARY REPORT.
Adelphi Univ., Garden City, N. Y.
D. E. Cunninghan. 1966, 55p NASA-SP-122
Conf. Held At Jpl, 8-9 Nov. 1965

Descriptors: *Conference, *Nasa program, *University program, Administration, Coast, Cooperation, Development, Program, Research, Science, University, West.

For abstract, see STAR 05 02.
N67-11943 HC$3.00 MF$0.65

THE FEDERAL BUDGET AND THE OUTLOOK FOR DEFENSE SPENDING.
Washington Univ., St. Louis, Mo. Dept. Of Economics.
M. L. Weidenbaum. Nov 66, 23p NASA-CR-80116
Grant NSG-342
Its Working Paper No. 6610

Descriptors: *Budget, *Defense, *Economics, *United states, Military, Program, Space.

For abstract, see STAR 05 02.
N67-12264 HC$3.00 MF$0.65

5B. DOCUMENTATION AND INFORMATION TECHNOLOGY

REFERENCE EQUIPMENT OF THE CENTRAL BRANCH REFERENCE INFORMATION CENTER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
T. D. Grodetskaya. 7 Dec 66, 21p FTD-HT-66-255
TT-67-60213
Unedited rough draft trans. of mono. Sozdanie i Ispolzovanie Tsentralnogo Otraslevogo Spravochno-Informatsionnogo Fonda, Moscow, 1964 p74-85.

Descriptors: (*Technical information centers, *Information retrieval), Libraries, Automation, Punched cards, USSR, Indexes, Subject indexing.

The functions and library equipment of the reference and information center are described. Because the work depends on a close cooperation with the scientific technical library, recommendations were made for further improvement of this relationship by a partial mechanication of the procedures through the use of special perforated card-systems (perfor-cards). Cards with marginal perforation which required special handling were inferior to the visual perfocards manufactured by the computer factories and used without any mechanical equipment. The card systems were classified as thematic-or specialty-registers according to their functions. Visual and marginal perfocards were used in both cases. (Author)
AD-643 630 HC$3.00 MF$0.65

PUNCH-CARD INFORMATION RETRIEVAL SYSTEMS FOR FLASHBLINDNESS PROTECTION RESEARCH. I. PHOTOCHROMIC MATERIALS.
Army Natick Labs., Mass. Clothing and Organic Materials Div.
For primary bibliographic entry see Field 6P.
AD-643 772 HC$3.00 MF$0.65

SELECTED OFFICIAL PUBLICATIONS, PROFESSIONAL PAPERS, AND PATENTS.
Naval Ordnance Test Station, China Lake, Calif.
Oct 66, 39p NOTS-TP-4063

Descriptors: (*Reports, Naval research), Abstracts, Patents, Rockets, Guided missiles, Propellants, Test facilities.

The booklet gives titles and abstracts of unrestricted publications by employees of the U. S. Naval Ordnance Test Station 9 (NOTS) issued during 1965. It lists official publications, professional papers published in the open literature, and U. S. Patents.
AD-643 782 HC$3.00 MF$0.65

ANALYSIS OF CASE HISTORIES OF PERSONAL INDEX USE,
Florida State Univ., Talahassee. Library School.
G. Jahoda, Ronald Hutchins, and Dolores M. Miller. Jun 66, 16p
AFOSR-66-2846
Grant AF-AFOSR-895-65

Descriptors: (*Information retrieval, *Indexes), Documentation, Scientific personnel, Engineering personnel, Subject indexing, Reports.

Case histories are summarized for 12 researchers in science and engineering at the Florida State University, i.e., 6 chemists, 4 biologists, 1 engineer, and 1 meteorologist. Over a 10-month period, 258 histories were obtained. The data do not permit the determination with certainty the type of subject index most suitable for a particular type of subject question. Over 70% of the inquiries were subject questions; over 80% of these required only a logical product search. Question-document title pairs were analyzed for each of 381 documents selected as answers to 170 subject questions. Of a possible 1142 concepts, 604 question concepts were matched by document title concepts. Material less than one year old account for less than 1% of the selected documents. Over 20% of the selected documents were over 10 years old, and included a low incidence of conference papers and government reports. A key-word-out-of-context index will be tested in future studies. (Author)
AD-643 869 HC$3.00 MF$0.65

UNIVERSAL TRANSLATOR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. Makrushenko. 5 Oct 66, 6p FTD-HT-66-343
Unedited rough draft trans. of Pravda, Leningrad (USSR) n163 p4 1964.

Descriptor : (*Machine translation, Language), USSR, Linguistics, Grammars, Mathematical analysis, Speech, Russian language.

A small group of linguists is investigating all language laws in order to develop a general theory of decoding speech. They are attempting to solve not just partial problems of a certain single language, but to derive general rules suitable for any language. A universal method of investigating all languages with the aid of electron machines is being derived to show how easy it would be to decode even 'dead' languages, and languages of the foginess of Andromeda, if such a language ever existed. (Author)
AD-643 980 HC$3.00 MF$0.65

BIBLIOGRAPHY OF MATERIALS ON SELECTED GROUPS IN THE REPUBLIC OF VIETNAM.
American Univ., Washington, D. C. Center for Research in Social Systems.
Dec 66, 32p
Contract DA-49-092-ARO-7

Descriptors: (*Vietnam, Bibliographies), Economics, Religion, Political science, Social sciences, Anthropology.

This is a bibliography, arranged alphabetically by author, of unclassified material on selected ethnic

and religious minority groups in the Republic of Vietnam. It is a comprehensive listing of French- and English-language sources providing information on the fundamental ethnic, social, economic, religious, and political characteristics of the groups.
AD-643 989 HC$3.00 MF$0.65

SOCIAL SCIENCES INFORMATION SYSTEMS WORKSHOP PROCEEDINGS.
American Univ., Washington, D. C. Center for Research in Social Systems.
For primary bibliographic entry see Field 5K.
AD-643 990 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS, VOLUME 6, NUMBER 7.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
31 Aug 66, 36p
Contract AT (45-1)-1830

Descriptors: (*Nuclear physics, Plutonium), (*Plutonium, Abstracts).

For abstract, see NSA 20 24.
BNWL-113-19 HC$3.00 MF$0.65

IMPLEMENTATION, TEST AND EVALUATION OF A SELECTIVE DISSEMINATION SYSTEM FOR NASA SCIENTIFIC AND TECHNICAL INFORMATION FINAL REPORT.
International Business Machines Corp., Yorktown Heights, N. Y.
Jun 66, 95p NASA-CR-62020
Contract NASW-695

Descriptors: *Data retrieval, *Information processing, *Nasa program, *Performance characteristics, *Statistical analysis, Analysis, Characteristics, Data, Distribution, Evaluation, Information, Performance, Processing, Profile, Retrieval, Science, Statistical, Technical, Test.

For abstract, see STAR 05 02.
N67-11241 HC$3.00 MF$0.65

NASA SELECTIVE DISSEMINATION OF INFORMATION PROGRAM (IBM 7090)94 SYSTEM/.
National Aeronautics And Space Administration, Washington, D. C.
G. A. Young. Jun 66, 80p NASA-TM-X-57001

Descriptors: *Computer program, *Data retrieval, *Information processing, *Nasa program, Computer, Data, Distribution, Documentation, Ibm 7090 computer, Ibm 7094 computer, Information, Literature, Processing, Profile, Program, Retrieval, Science, Selective, Technical.

For abstract, see STAR 05 02.
N67-11243 HC$3.00 MF$0.65

FY 1966 SCIENTIFIC AND TECHNICAL REPORTS, ARTICLES, PAPERS, AND PRESENTATIONS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Oct 66, 43p NASA-TM-X-59077, MS-I-66-02

Descriptors: *Bibliography, *Nasa program, Aerodynamics, Combustion, Communications, Electronics, Fluid, Geophysics, Instrumentation, Machine, Mechanics, Metal, Navigation, Physics, Propulsion, Radiation, Science, Space, Space vehicle, Structural, Thermodynamics.

For abstract, see STAR 05 02.
N67-12062 HC$3.00 MF$0.65

BIBLIOGRAPHY OF THE COMPUTER CODES LITERATURE EXAMINED BY THE RADIATION SHIELDING INFORMATION CENTER,
Oak Ridge National Lab., Tenn.
Betty F. Maskewitz, and Betty L. McGill. Oct 66, 64p
Contract W-7405-eng-26

Descriptors: (*Reactor shielding calculations, Bibliographies), (*Programming (Computers), Reactor shielding calculations).

For abstract, see NSA 20 24.
ORNL-RSIC-15 HC$3.00 MF$0.65

A PROPOSAL FOR DUAL PUBLICATION OF SCIENTIFIC JOURNALS,
Rochester Univ., N. Y. Library.
Phyllis A. Richmond. 7 May 62, 4p
Pub. in American Documentation v14 n1 p54-5 Jan 1963. NSF Scientific Documentation Project.

Descriptors: (*Periodicals, Scientific research), (*Libraries, Periodicals), Documentation, Printing, Information retrieval.

The sense of urgency apparent in the appeals of scientists for faster access to their literature suggests that there might be a definite market for a dual run of every scientific, medical, or engineering journal of any stature. This would mean a first run, either on cheap paper such as newsprint or in some form of microprint. Possibly this first run could be made from page proofs. Such an issue would be sent immediately to libraries and research facilities for use as unbound circulating copies. It might pay research libraries to buy several sets of these expendable copies for different branches or departments. The run would be regarded as useful for current awareness only and not retained for binding. (Author)
PB-173 682 HC$3.00 MF$0.65

A STANDARD CORPUS OF EDITED PRESENT-DAY AMERICAN ENGLISH,
Brown Univ., Providence, R. I.
For primary bibliographic entry see Field 5G.
PB-173 687 HC$3.00 MF$0.65

THE COMPUTER AND INFORMATION SCIENCES: A NEW BASIC DISCIPLINE.
Pennsylvania Univ., Philadelphia. Moore School of Electrical Engineering.
For primary bibliographic entry see Field 9B.
PB-173 688 HC$3.00 MF$0.65

WHAT ARE WE LOOKING FOR. ATTENTION TO THE NATURE OF SCIENTIFIC DISCOVERY WOULD PRODUCE BETTER INFORMATION RETRIEVAL SYSTEMS,
Rochester Univ., N. Y. Library.
Phyllis Allen Richmond. 1963, 3p
NSF Scientific Documentation Project. Reprinted from Science v139 n3556 p737-9 Feb 22 1963.

Descriptors: (*Information retrieval, *Scientific research), Documentation, Scientific personnel, reports.

Currently there is a stampede into science information retrieval systems--that is, systems designed to recover factual data from the printed mass--and, to a lesser extent, into document retrieval systems--those designed to disinter a book, article, review, or report, per se, for someone who will then read it to retrieve its information content. There has been too much focusing of attention on ways and means, particularly lucrative ways and means, accompanied by a plethora of silly arguments and downright battles, all obscuring the need to answer the fundamental question: What are we looking for. The general argument is that we are looking for scientific work that has already been done so that it will not be necessary to do it over again. If we are indeed looking for something like a method of synthesizing a compound, or if we want to know whether such a compound has been made, probably the science information retrieval systems available are as good or bad as we deserve. But suppose we are looking for a new field theory or a scientific approach that will open up new lines of research. Factual retrieval systems will not suffice.
PB-173 689 HC$3.00 MF$0.65

5C. ECONOMICS

INCOME AND SUBSTITUTION EFFECTS IN A FAMILY LABOR SUPPLY MODEL.
Doctoral thesis,
RAND Corp., Santa Monica, Calif.
Marvin H. Kosters. Dec 66, 76p P-3339

Descriptors: (*Labor, *Wages), (*Economics, *Employment), Males, Females, Mathematical models, Reviews.
Identifiers: Families, Taxes.

A review is presented of the effect of the tax rate and the market wage rate on labor supply. The discussion of factors influencing labor supply is used as a foundation for the development of a family labor supply model. The purpose of the model is to specify more precisely the nature of income and relative price effects in labor supply equations and to show how coefficients estimated using various specifications of regression equations can be interpreted. A description is presented of the data used in the empirical research on the effect of income and wage rates on average hours of work per week and per year of male family heads. The results of the research are reported. Income and wage rate effects on the labor force participation rates of married women and of males comprising a large fraction of the total work force reported in three earlier studies are reinterpreted to obtain estimates of compensated wage effects. (Author)
AD-643 692 HC$3.00 MF$0.65

CENTRAL PLANNING AND ITS LEGACIES,
RAND Corp., Santa Monica, Calif.
Egon Neuberger. Dec 66, 57p P-3492

Descriptors: (*Economics, USSR), Communism, Management control systems, Industrial production, Labor, Commerce, Costs, Political science, Distribution (Economics), Yugoslavia.

An attempt is made to select the key elements of the Soviet-type system and the desirable and undesirable consequences likely to follow from these elements. A discussion is presented to show why the balance is likely to shift over time and make the system produce more undesirable than desirable consequences, forcing the system's directors to consider a change in the system. This discussion serves to bring together in one place the various considerations that are necessary to evaluate the relative merits of the Soviet-type system of central planning during its own lifetime. It also lays the groundwork for a discussion of the probable legacies of the Soviet-type system which will make the process of transition to its successor much more difficult and painful, and which will provide a favorable or unfavorable inheritance to the new system once it is established. Some of the legacies are illustrated from the experience of Yugoslavia, the only country that has completely abandoned the Soviet-type system. (Author)
AD-643 763 HC$3.00 MF$0.65

A COMPARISON OF SALARIES PAID TO SCIENTISTS AND ENGINEERS BY DEFENSE LABORATORIES AND BY PRIVATE INDUSTRY.
Office of the Director of Defense Research and Engineering, Washington, D. C. Office for Laboratory Management.
For primary bibliographic entry see Field 5I.
AD-643 800 HC$3.00 MF$0.65

Group 5C — Economics

RESOURCE ALLOCATION UNDER UNCERTAINTY AND DEMAND INTERDEPENDENCE,
California Univ., Los Angeles. Western Management Science Inst.
A. Reisman, A. B. Rosenstein, and E. S. Buffa.
1966, 12p WMSI Reprint-35
Contract Nonr-233 (73)
Supported in part by Ford Foundation.
Availability: Published in The Journal of Industrial Engineering v17 n8 p402-9 Aug 1966.

Descriptors: (*Budgets, *Management planning), Distribution, Money, Uncertainty.
Identifiers: Resource allocation.

A methodology is proposed for the allocation of a fixed amount of resources among competing sectors of an enterprise, the operations of which may be interrelated, where an allocation decision has to be made under conditions of uncertainty and where intangible factors predominate. The procedural steps include: (1) selecting the criteria, a functional scale between each criterion and the per unit allocation, the most relevant or indispensable needs in each category and a weighting function for each criterion; (2) applying Lagrange's method of undetermined multipliers; (3) selecting relative weights for the criteria; and (4) determining the final allocations. (Author)
AD-643 904 Not available from CFSTI.

ECONOMIC PLANNING AND THE COST OF DECISION MAKING
California Univ., Los Angeles. Western Management Science Inst.
Jacob Marschak. 1966, 13p WMSI Reprint-36
Availability: Published in Social Research v33 n2 p151-9 1966.

Descriptors: (*Management engineering, Group dynamics), (*Decision making, Reasoning), Economics, Costs, Probability, Industrial production, Money, Operations research, Research program administration.

We shall call economic planning the process of arriving at an optimal decision. A decision, or action, is called optimal if, in the decision-maker's well-considered view, and allowing for the cost of making the decision, its results will be, on the average, not worse than those of any other available action. The set of available actions is called his 'resources.' Economic planning is, in this sense, concerned with the 'best use of resources.'
AD-643 905 Not available from CFSTI.

FOREWORD: A REMARK ON ECONOMETRIC TOOLS,
California Univ., Los Angeles. Western Management Science Inst.
Jacob Marschak. Aug 66, 9p WMSI Reprint-37
Availability: Published in Econometric Models and Methods p7-9 1966.

Descriptors: (*Economics, Reviews), Predictions, Analysis, Measurement, Mathematical analysis.

A critique is given on Carl F. Christ's book, 'Econometric Models and Methods'; New York: John Wiley, 1966.
AD-643 906 Not available from CFSTI.

ESSAYS ON COMMODITY FLOWS AND THE SPATIAL STRUCTURE OF THE INDIAN ECONOMY.
Research paper,
Chicago Univ., Ill. Dept. of Geography.
Brian J. Berry. Dec 66, 348p RP-111
Contract Nonr-2121 (27)
Final rept.

Descriptors: (*India, *Economics), Commerce, Factor analysis, Shipping (Marine), Agriculture, Labor, Sociology, Population, Industries, Industrial production, Consumption, Distribution (Economics), Money, Mathematical models.

The final report consists of a monograph: Essays on Commodity Flows and the Spatial Structure of the Indian Economy. There are three essays: Indian Commodity Flows; Interdependencies of Flows and Spatial Structure: A General Field Theory Formulation; and Interregional Intersectoral Relations of the Indian Economy. In addition, the first essay includes an Atlas of Indian Commodity Flows. The interdependent character of location of economic activities and interregional flows is demonstrated, and the patterns specific to the Indian economy are outlined. (Author)
AD-644 152 HC$3.00 MF$0.65

A CONDITION FOR THE COMPLETENESS OF PARTIAL PREFERENCE ORDERS.
Hebrew Univ., Jerusalem (Israel). Dept. of Mathematics.
For primary bibliographic entry see Field 12A.
AD-644 159 HC$3.00 MF$0.65

FEDERAL NON-DEFENSE EXPENDITURES THEIR SHIFTING IMPACT ON THE REGIONAL DISTRIBUTION OF INCOME.
Washington Univ., St. Louis, Mo. Dept. Of Economics.
G. W. Williams. Nov 66, 32p NASA-CR-79997
Grant NSG-342
Its Working Paper 6609

Descriptors: *Economics, *Management planning, *Program management, Development, Distribution, Expenditure, Government, Income, Management, Planning, Program, Region, U.S.A., Welfare.

For abstract, see STAR 05 02.
N67-11841 HC$3.00 MF$0.65

RESEARCH AND REGIONS. A KWIC INDEXED BIBLIOGRAPHY.
Missouri Univ., Columbia. Business And Public Administration Research
J. Graves, and J. C. Murdock. 1966, 228p
NASA-CR-80097, LC-66-65231
Contract NGR-26-004-012

Descriptors: *Bibliography, *Data processing, *Economics, Administration, Computer, Region, Research, Retrieval, Technique.

For abstract, see STAR 05 02.
N67-12157 HC$3.00 MF$0.65

5D. HISTORY, LAW, AND POLITICAL SCIENCE

REVIEW OF SOVIET STRATEGIES IN SOUTHEAST ASIA: AN EXPLORATION OF EASTERN POLICY UNDER LENIN AND STALIN,
RAND Corp., Santa Monica, Calif.
Thomas W. Robinson. Nov 66, 5p P-3488
Pub. in American Political Science Review.

Descriptors: (*Foreign policy, USSR), (*Communism, Foreign policy), Political science, Government (Foreign), History, Southeast Asia.

The paper reviews the book Soviet Strategies in Southeast Asia by Charles McLane. Charles McLane, Professor at Dartmouth College, has written an exhaustive, penetrating, and lucid study of Soviet policy toward Southeast Asia through 1953. Although not written for the general reader since it presumes a general knowledge of the history of communism in that area, the book breaks new ground in terms of the completeness of its survey and in its success in tying down more closely a number of factual points which were in doubt before. McLane's book therefore complements the work done by others before him as well as serves as a sequel to his own previous work on Soviet policy toward the Chinese Communists. Two particular features are first that McLane apparently used almost all of the Soviet sources on the subject available in the West, and second that the author conducted a large number of interviews in Southeast Asia with governmental officials and current and ex-Communist leaders. Those features lend a degree of authority to the results which will not easily be overcome by subsequent research.
AD-643 496 HC$3.00 MF$0.65

TECHNOLOGY AND ARMAMENT. NO. 3, 1966: SELECTED ARTICLES.
Department of the Army, Washington, D. C.
4 Nov 66, 124p J-0024
TT-67-60215
Trans. of Tekhika i Vooruzhenie (USSR) n3 p1-81, 94-6 1966.

Descriptors: (*Economics, USSR), (*Armament, USSR), (*Military training, USSR), Industrial production, Armed forces (Foreign), Psychometrics, Vehicles, Transportation, Communication systems, Maintenance, Fuels, Oils, Armament.

Table of Contents: The Five-Year Plan Starts; Armament, Equipment, Apparatus; Technical Training; Operation, Care, Repair; The Creativity of Innovators; The World of Books.
AD-643 646 HC$3.00 MF$0.65

STUDIES IN DEFERRENCE. XIII. PATTERN AND LEVEL OF RISK IN SOVIET FOREIGN POLICY-MAKING, 1945-1963.
Final rept.,
Stanford Univ., Calif.
Jan F. Triska. Oct 66, 72p
NOTS-TP-3880
Contract N123 (60530)34324A

Descriptors: (*Foreign policy, USSR), (*Deterrence, Foreign policy), Probability, Cold war, Communism, Leadership, Strategic warfare, Game theory, Decision making, Political science.

Soviet behavior in risk situations is analyzed for 29 crises from 1945 to 1963. The inherent risk for the Soviet Union in each crisis situation is scaled according to: The countries involved; The stakes; Geographical location; Developmental factors; Relative military strength. Soviet behavior in each crisis is scaled according to: Proportionality of risk-taking to objectives (actional symmetry construct); Maximum Soviet bid; Character of crisis outcome; Timing of major moves. The behavioral variables are tested for statistical correlation with the situational variables.
AD-643 949 HC$3.00 MF$0.65

MILITARY ASPECTS OF INTERNATIONAL RELATIONS IN THE DEVELOPING AREAS,
RAND Corp., Santa Monica, Calif.
Constantine C. Menges. Dec 66, 106p P-3480

Descriptors: (*Arms control, Political science), Armament, Armed forces (Foreign), Foreign policy, Cold war, Manpower, Disarmament, Deterrence, South Asia, Southeast Asia, North Africa, Subsaharan Africa, Latin America, Power, History.
Identifiers: Near East, Military assistance, International relations.

A broad view is taken of one facet of international politics in the developing areas -- the relationship between armaments and patterns of State relations. By isolating a specific and identifiable factor usually of great importance in the relations of sovereign states -- military power -- and taking a large number of diverse countries in six different regional contexts, the author attempts to capture the

essence of major trends and observe important departures or similarities in the international political role of armaments in comparison with the European state system.
AD-644 113 HC$3.00 MF$0.65

ATLANTICA, EUROPA, GERMANIA: 1966,
RAND Corp., Santa Monica, Calif.
Horst Mendershausen. Oct 66, 70p RM-5170-PR
Contract AF 49 (638)-1700

Descriptors: (*Europe, *Political science), Cold war, Attitudes, East Germany, West Germany, Foreign policy, Leadership, Military organizations.
Identifiers: NATO, International relations.

A survey is presented of current political trends in Europe based on the author's observations during a two-month visit in the summer of 1966. Discussed are (1) the European political environment evolving as the discipline imposed on Europe by the cold war diminishes; (2) European attitudes toward the United States and the Atlantic Alliance: (3) the problem of European unification: and (4) the special problem of Germany. (Author)
AD-644 114 HC$3.00 MF$0.65

5E. HUMAN FACTORS ENGINEERING

HUMAN RESOURCES RESEARCH OFFICE BIBLIOGRAPHY OF PUBLICATIONS AS OF 30 JUNE 1966.
Cumulative bibliography.
George Washington Univ., Alexandria, Va. Human Resources Research Office.
Sep 66, 237p
Contract DA-44-188-ARO-2

Descriptors: (*Military training, Human engineering), (*Human engineering, Bibliographies), Culture, Military personnel, Learning, Performance (Human), Military publications, Psychometrics, Military intelligence, Counterinsurgency, Psychological warfare, Motivation, Leadership.

The bibliography was compiled to provide as complete information as is feasible about HumRRO research publications and HumRRO research by-products. This information is intended primarily for use by Human Factors Research and Development personnel concerned with military problems, and Army personnel concerned with operational utilization of training and other research information and by-products. (Author)
AD-643 761 HC$3.00 MF$0.65

SYSTEMS RESEARCH WITH SPECIAL REFERENCE TO HUMAN ENGINEERING.
Technical rept.,
Dunlap and Associates, Inc., Stamford, Conn.
Kenneth Yarnold, and Ralph C. Channell. 2 Jan 52, 88p
SPECDEVCEN-641-2-13
Contract N8onr-641 (02)
Report on Human Engineering Systems Studies.

Descriptors: (*Human engineering, Operations research), (*Systems engineering, Costs), Military personnel, Training devices, Warfare, Probability, Economics, Control systems.

This report attempts to define 'systems research' in terms of the problems to which it is applicable, the techniques it employs, and the research staff it requires. A criterion for determining the usefulness of a system is presented, and the components of this criterion (namely: value, cost and investment) are discussed in detail. The report also presents problems which illustrate the application of the criterion; and from these examples, general rules for systems analysis are derived. The report ends with a discussion of the advances human engineers must make if they are to contribute to a more efficient, more economical method of systems building.
AD-643 829 HC$3.00 MF$0.65

5F. HUMANITIES

HEGELIAN INQUIRING SYSTEM, CHAPTER VI.
California Univ., Berkeley. Space Sciences Lab.
C. W. Churchman. Sep 66, 46p NASA-CR-80117
Grant NSG-243-62
Its Internal Working Paper No. 49

Descriptors: *Information theory, *Mental performance, *Philosophy, Behavior, Cybernetics, Human, Information, Mental, Performance, Theory.

For abstract, see STAR 05 02.
N67-12272 HC$3.00 MF$0.65

5G. LINGUISTICS

AUTOMATIC ENGLISH SENTENCE ANALYSIS.
Final scientific rept., no. 2, pt. 1, 1 Jul 65-30 Sep 66,
IDAMI Language Research Section, Milan (Italy).
Ernst V. Glasersfeld, Jehane Burns, Pier Paolo Pisani, Brunella Notarmarco, and Brian Dutton. 30 Sep 66, 111p ILRS-T-14, 660930
AFOSR-66-2848
Grant AF-EOAR-76-65
See also AD-622 570.

Descriptors: (*English language, Analysis), Automatic, Classification, Syntax, Semantics, Computers.
Identifiers: Multistore, Sentences.

The report contains a discursive description and flow diagrams of the machine program written for a GE 425 computer in order to implement the previously developed 'Multistore Procedure'. Advances in several related problem areas are reported: Classification of words in terms of 'correlation indices, i.e. by means of code numbers representing the words' possibilities of forming syntatic combinations with others; Reclassification, i.e. assignation of correlation indices to word combinations; Correlator range, i.e. the extent of syntactic government - in this case of prepositions - in English sentences; Grammatical and semantic factor analysis, i.e. analysis of grammatical functions and semantic content in terms of constant factors. (Author)
AD-643 868 HC$3.00 MF$0.65

THE LANGUAGE OF WORDS INTO THE LANGUAGE OF MATHEMATICS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
5 Oct 66, 6p FTD-HT-66-325
Unedited rough draft trans. of Kommunist, Erevan (USSR) 1964 4 Jul, p. 3.

Descriptors: (*Language, Mathematics), (*Mathematics, Vocabulary), Linguistics, Computational linguistics, Data storage systems, Computer storage devices, Effectiveness.
AD-643 993 HC$3.00 MF$0.65

ASPECTS OF THE THEORY OF SYNTAX SPECIAL TECHNICAL REPORT NO. 11.
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
N. Chomsky. 1965, 259p NASA-CR-79495
Grant NSG-496, Contract NSF GP-2495

Descriptors: *Language, *Semantics, Grammar, Human, Phonetics, Speech, Structure, Syntax, Word.

For abstract, see STAR 05 02.
N67-11399 HC$3.00 MF$0.65

A STANDARD CORPUS OF EDITED PRESENT-DAY AMERICAN ENGLISH,
Brown Univ., Providence, R. I.
W. Nelson Francis. 1966, 7p
Reprinted from College English v26 n4 p267-73 Jan 1965. NSF Scientific Documentation Project.

Descriptors: (*English language, *Dictionaries), Semantics, Grammars, Syntax, Data processing systems, Programming (Computers), Vocabulary, Linguistics.
Identifiers: Words.

A corpus of over a million running words of 'present-day edited American English' was prepared. The year 1961 was selected as being the most recent year for which library acquisitions would be sufficiently caught up so that books and periodicals would be readily accessible. Spoken English, except in the special form of speeches prepared in advance, was not included, nor were such forms as personal letters, student themes, and ephemeral mimeographed material. The overall size of the corpus is approximately a million words, and is divided into five hundred samples of about two thousand words each. There are fifteen main categories of material, some of which were further subdivided.
PB-173 687 HC$3.00 MF$0.65

5H. MAN-MACHINE RELATIONS

GRAPHICS.
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
For primary bibliographic entry see Field 9B.
AD-643 821 HC$3.00 MF$0.65

ORIENTATION IN AEROSPACE FLIGHT.
Naval School Of Aviation Medicine, Pensacola, Fla.
A. Graybiel. 10 Oct 66, 45p NASA-CR-80123
NASA ORDER R-93
Presented At 15th Intern. Congr. On Aviation And Space Med., Prague, 30 Sep. 1966 Its Spec. Rept.-66-6 Joint Rept. With Nasa

Descriptors: *Manned space flight, *Spatial orientation, *Weightlessness, Apparatus, Astronaut, Environment, Gravity, Manned, Orientation, Otolith, Perception, Sensory, Space, Space flight, Spatial, System, Vestibular, Vision.

For abstract, see STAR 05 02.
N67-12177 HC$3.00 MF$0.65

STIMULUS-ORIENTED APPROACH TO DETECTION RE-EXAMINED.
Texas Univ., Austin. Defense Research Lab.
L. A. Jeffress. 6 Sep 66, 37p NASA-CR-78973
Contract NASA ORDER R-129, NOBSR-93124
Prepared For Navy

Descriptors: *Auditory stimulus, *Continuous noise, *Human performance, *Signal detection, Auditory, Band, Continuous, Density, Detection, Distribution, Electric, Frequency, Function, Gate, Human, Model, Narrow, Noise, Performance, Prediction, Psychometrics, Signal, Stimulus, Theory.

For abstract, see STAR 05 02.
N67-12233 HC$3.00 MF$0.65

5I. PERSONNEL SELECTION, TRAINING, AND EVALUATION

JOB EVALUATION: SELECTING THE TYPE OF SYSTEM FOR NAVY USE.
Progress rept.,
Naval Personnel Program Support Activity, Washington, D. C. Personnel Research Lab.
Alexander J. Rose. Nov 66, 25p WRM-67-7
See also AD-639 165.

Descriptors: (*Job analysis, Navy), (*Personnel management, *Naval personnel), Factor analysis, Classification, Management engineering.

This is the third in a series of research reports leading to the design and development of a billet evaluation system for Navy enlisted billets. This report analyzes and reviews the four conventional methods of job evaluation in terms of their application to Navy billets. The report concludes that the point rating method of job evaluation is the best technique for determining the relative value of Navy billets. It recommends that work proceed on developing the details of a point rating system tailored to the mission and needs of the Navy. (Author)
AD-643 508 HC$3.00 MF$0.65

A STUDY AND INVESTIGATION OF THE QUANTIFICATION OF PERSONNEL IN MAINTENANCE.
Interim rept. Mar-Jul 66,
Philco Corp., Willow Grove, Pa. Communications and Electronics Div.
B. E. Crumrine, T. H. Levine, and C. F. Martinetz. Oct 66, 156p
RADC-TR-66-442
Contract AF 30(602)-4129

Descriptors: (*Maintenance personnel, Selection), (*Electronic technicians, Performance (Human)), Personality, Training, Aptitude tests, Aviation personnel, Performance tests, Psychometrics.

A study design is presented for application to airmen technicians performing electronic maintenance to determine those variables which may serve as indicators of technician proficiency. A literature review was conducted and variables indicating some promise of predictive value of quality of electronic maintenance performance were selected for further refinement. A method for the quantification of human maintenance performance in electronic systems is provided. A mathematical plan for the development of a human performance figure of merit and determination of degree, and significance of relationship between the variables and the figure of merit is included. (Author)
AD-643 544 HC$3.00 MF$0.65

TECHNOLOGY AND ARMAMENT. NO. 3, 1966: SELECTED ARTICLES.
Department of the Army, Washington, D. C.
For primary bibliographic entry see Field 5D.
AD-643 646 HC$3.00 MF$0.65

CBR TRAINING AID REQUIREMENTS, ARMY WIDE.
George Peabody Coll. for Teachers, Nashville, Tenn.
For primary bibliographic entry see Field 15B.
AD-643 654 HC$3.00 MF$0.65

FURTHER ATTEMPTS TO DEMONSTRATE INTERFERENCE IN THE PERFORMANCE OF ROTARY PURSUIT TASKS.
Technical rept.,
Iowa State Univ., Iowa City.
James L. Hedlund, and Don Lewis. 27 Jun 50, 13p
SPECDEVCEN-938-1-3
Contract N9onr-938 (01)

Descriptors: (*Motor reactions, *Transfer of training), (*Learning, Motor reactions), (*Performance (Human), Interference), Targets, Rotation, Pursuit courses, Training, Human engineering, Training devices.
Identifiers: Rotary pursuit tasks.

A brief account is given of several investigations involving rotary pursuit tasks, which attempted to obtain evidence of the functioning of interference (negative transfer). Two new rotary pursuit devices--the Double-Disk Pursuit Apparatus with Auxiliary Wobble-Stick and the Epicyclic Pursuit Rotor--are introduced, and several unsuccessful attempts to detect interference effects with them are described. Because interference has not been reliably demonstrated with rotary pursuit devices, the question was raised as to why rotary pursuit learning is relatively impervious to interference effects while other forms of motor learning are not. An 'explanation' of the apparent absence of interference and of the presence of positive transfer in pursuit activity is given in a restatement of the Wylie hypothesis. (Author)
AD-643 656 HC$3.00 MF$0.65

STUDENT OFFICER ATTITUDES TOWARD THE AIR FORCE,
Baylor Univ., Waco, Tex. Dept. of Psychology.
Lloyd R. Chason, Roger E. Kirk, and Jerry Wofford. Dec 66, 69p

Descriptors: (*Air force personnel, Attitudes), Psychometrics, Officer personnel, Students, Selection, Aviation personnel, Training.

Attitudes of navigator trainees toward the Air Force were determined by means of a sentence completion test. The subjects were 278 student officers at James Connally Air Force Base. An analysis of the data indicates that student officers have relatively favorable attitudes toward the Air Force. The trainees expressed the most favorable attitudes toward flying, being in the Air Force, and instructors in the training program. A negative correlation was found between length of time in the training program and the degree of favorableness of the student officers' attitude toward the Air Force. The favorableness of student officers' attitude toward the Air Force was not found to correlate with academic grades, flight mission grades, military training subjects, or physical education proficiency grade. However, student officers' attitudes were correlated with their military instructor evaluation. Significant differences in attitudes toward the Air Force were found for student officers who entered the program with different previous training experiences. It was concluded that the training program did not lead to a greater concensus or homogeneity of attitudes toward the Air Force for the seven attitude areas investigated in this study. (Author)
AD-643 686 HC$3.00 MF$0.65

HUMAN RESOURCES RESEARCH OFFICE BIBLIOGRAPHY OF PUBLICATIONS AS OF 30 JUNE 1966.
George Washington Univ., Alexandria, Va. Human Resources Research Office.
For primary bibliographic entry see Field 5E.
AD-643 761 HC$3.00 MF$0.65

A COMPARISON OF SALARIES PAID TO SCIENTISTS AND ENGINEERS BY DEFENSE LABORATORIES AND BY PRIVATE INDUSTRY.
Management analysis note,
Office of the Director of Defense Research and Engineering, Washington, D. C. Office for Laboratory Management.
Frank A. Nicolai. 28 Sep 65, 24p MAN-65-1

Descriptors: (*Wages, Analysis of variance), (*Engineering personnel, Wages), (*Scientific personnel, Wages), Education, Professional personnel, Statistical analysis, Personnel management, Department of Defense, Industrial relations.

Data dividing the entire population of professionals in science and engineering into subpopulations on the basis of age, salary and degree (level of educational attainment) became available and are employed in the analysis of salary comparability. In addition to the mean salaries of these subpopulations, the boundary salaries for their upper quartiles and deciles are examined. This approach represents an attempt to avoid the pitfalls of concentrating solely on mean salary. For example, while the mean salary of professionals in two organizations may be the same, the top 10 percent in one may be paid significantly more than the comparable group in the other. In that situation, the first organization could 'bid away' the top professionals from the second. By analyzing the standard deviations of salaries received by these subpopulations, an attempt is made to measure salary dispersion, which may be very important to the retention of highly qualified professionals. (Author)
AD-643 800 HC$3.00 MF$0.65

A SECOND STUDY OF FACTORS AFFECTING AIRCREW MORALE.
School of Aerospace Medicine, Brooks AFB, Tex.
For primary bibliographic entry see Field 5J.
AD-643 820 HC$3.00 MF$0.65

TRAINING TIME AND COSTS FOR SELECTED RATINGS AND NECS,
Naval Personnel Program Support Activity, Washington, D. C. Personnel Research Lab.
James N. Clary. Mar 66, 157p WRM-66-33

Descriptors: (*Naval personnel, Military training), (*Naval training, Military personnel), Navy budgets, Naval procurement, Costs, Time studies, Personnel management, Classification.

The report is designed to meet the urgent need of the Chief of Naval Personnel for firm data on enlisted training time and costs to be used as inputs to the Career Premium Computer Program for determining Pro Pay eligibility. Specifically, it presents the training time and funds invested in enlisted personnel from initial procurement through appropriate basic training for 25 ratings and advanced and/or specialized training for 174 Navy Enlisted Classification Codes. The costs presented herein are based on the latest available information and reflect all known adjustments.
AD-643 843 HC$3.00 MF$0.65

OFFICER PERSONNEL COSTS: AVIATION OFFICER CANDIDATE (AOC),
Naval Personnel Program Support Activity, Washington, D. C. Personnel Research Lab.
James N. Clary. Jul 65, 39p WRM-66-1

Descriptors: (*Officer personnel, Costs), (*Pilots, Naval aircraft), Naval procurement, Armed forces budgets, Cost effectiveness, Aviation personnel, Flight simulators, Training devices.

The report presents the costs of officers procured through the Aviation Officer Candidate (AOC) Program, from initial procurement through one year past initial service obligation. Information contained in this report should prove useful for such purposes as planning, budgeting, and the officer retention effort. The personnel costs presented herein are based on the latest available information. (Author)
AD-643 844 HC$3.00 MF$0.65

TRAINING EQUIPMENT AND BUILDING AMORTIZATION STUDY.
Naval Personnel Program Support Activity, Washington, D. C. Personnel Research Lab.
For primary bibliographic entry see Field 5A.
AD-643 845 HC$3.00 MF$0.65

DESIGN OF AN ENLISTED PERSONNEL COST ANALYSIS SYSTEM,
Naval Personnel Program Support Activity, Washington, D. C. Personnel Research Lab.
Jerome I. Bershtein. Oct 66, 69p WRM-67-11

Descriptors: (*Naval personnel, Wages), Personnel management, Costs, Recruiting, Naval training, Transportation, Mathematical models.

The memorandum provides in some detail the procedures and concepts of the enlisted personnel cost analysis system developed by the Personnel Research Laboratory. Sources of information and problem areas encountered during the course of research are also indicated. (Author)
AD-643 965 HC$3.00 MF$0.65

GRAPHICAL PERT ANALOG SHOP SCHEDULING FOR PUBLIC WORKS DEPARTMENT,
Pacific Missile Range, Point Mugu, Calif.
G. C. True. 11 Oct 66, 87p PMR-MR-66-6

Descriptors: (*Scheduling, *Manpower), Job analysis, Management engineering, Personnel management, Analog systems, Management planning, Graphics.
Identifiers: Public works facilities, PERT.

The report contains a description of the graphical PERT analog (GPA) method used by the Public Works Department, Point Mugu, for shop scheduling. Background material of the method is given, the practical applications and procedures used, and requirements for training planning and shop supervisors in the use of the GPA. (Author)
AD-643 986 HC$3.00 MF$0.65

THE DESIGN OF INSTRUCTIONAL SYSTEMS.
Technical rept.,
George Washington Univ., Alexandria, Va. Human Resources Research Office.
Robert G. Smith, Jr. Nov 66, 92p TR-66-18
Contract DA-44-188-ARO-2

Descriptors: (*Training, Cost effectiveness), Programmed instruction, Training devices, Transfer of training, Systems engineering, Learning, Students, Performance (Human), Teaching methods, Efficiency.

The report, based on an extensive survey of current literature, describes and discusses a system approach to designing training and considers factors bearing on training effectiveness. An efficient instructional system is conceived as one in which the components form an integrated whole, achieving maximum effectiveness at the least possible cost. Components considered in this report include presentation media, student management, techniques for practicing knowledge and performance, knowledge of results, directing student activities toward the goals of the training program, and testing and evaluating the system in terms of efficiency and cost. (Author)
AD-644 054 HC$3.00 MF$0.65

FURTHER EVIDENCE ON SECONDARY TASK INTERFERENCE IN TRACKING.
Kansas State Univ., Manhattan.
F. Fowler, M. Noble, and D. Trumbo. 1966, 13p
NASA-CR-79622
Grant NSG-606
Submitted For Publication

Descriptors: *Human performance, *Psychology (gen), *Tracking study, Factor, Human, Interference, Learning, Performance, Retention, Secondary, Skill, Study, Target, Task, Tracking, Verbal.

For abstract, see STAR 05 02.
N67-11695 HC$3.00 MF$0.65

SEQUENTIAL PROBABILITIES AND THE LEARNING AND RETENTION OF TRACKING SKILL.
Kansas State Univ., Manhattan.
M. Noble, J. Quigley, and D. Trumbo. 1966, 14p
NASA-CR-79915
Grant NSG-606
Presented At The Midwestern Psychol. Assoc. Meeting, Chicago, 6 May 1966

Descriptors: *Human performance, *Learning, *Probability, *Sequential detection, *Task, Human, Performance, Prediction, Response, Retention, Sequence, Skill, Strategy, Tracking.

For abstract, see STAR 05 02.
N67-11847 HC$3.00 MF$0.65

THE ORGANIZATION OF SKILLED RESPONSE.
Kansas State Univ., Manhattan.
M. Noble, and D. Trumbo. 1966, 42p NASA-CR-79919
Grant NSG-606, Contract AF-AFOSR-62-17
Submitted For Publication

Descriptors: *Human performance, *Spatial perception, *Stimulus, *Time response, Analysis, Anticipation, Coding, Coherence, Fine, Grain, Human, Length, Organization, Pattern, Perception, Performance, Prediction, Property, Response, Sequence, Spatial, Statistical, Task, Time, Tracking.

For abstract, see STAR 05 02.
N67-11849 HC$3.00 MF$0.65

ON THE LENGTH-DIFFICULTY RELATION IN SKILL PERFORMANCE.
Kansas State Univ., Manhattan.
M. Noble, J. Swink, and D. Trumbo. 1966, 18p
NASA-CR-79920
Grant NSG-606
Submitted For Publication

Descriptors: *Human performance, *Learning system, *Time response, *Tracking study, Acquisition, Human, Learning, Length, Motor, Performance, Response, Retention, Sequence, Skill, Study, System, Task, Time, Tracking.

For abstract, see STAR 05 02.
N67-11850 HC$3.00 MF$0.65

PRINCIPLES, TECHNIQUES AND APPROACH USED IN CONDUCTING PROGRAM IN SPACE SYSTEM ENGINEERING.
Stanford Univ., Calif. School Of Engineering.
W. Bollay. 1966, 57p NASA-CR-79753
Contract NSR-05-020-151

Descriptors: *Space systems engineering, *Training, Design, Engineering, Nasa program, Probe, Solar, Space, System, Teaching, Technique.

For abstract, see STAR 05 02.
N67-12221 HC$3.00 MF$0.65

5J. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AN EXPERIMENTAL PROGRAM FOR RELATING TRANSFER OF TRAINING TO PILOT PERFORMANCE AND DEGREE OF SIMULATION.
Final technical rept., Jun 63-Jul 64,
Life Sciences, Inc., Fort Worth, Tex.
Robert G. Demaree, Don A. Norman, and William G. Matheny Jun 65, 77p
NAVTRADEVCEN-1388-1
Contract N61339-1388

Descriptors: (*Transfer of training, Performance (Human)), (*Pilots, Transfer of training), Flight simulators, Jet fighters, Cockpits, Simulation, Performance tests, Jet training planes, Programming (Computers), Handling, Digital computers, Measurement, Feasibility studies, Display systems, Military training.
Identifiers: F-100 aircraft.

The universal digital operational flight trainer tool (UDOFTT), programmed to simulate a high-performance, single-engine jet fighter, was used for an initial pilot performance study. Six maneuvers were employed in conjunction with real-time simulation of in-flight piloting tasks in an F-100A cockpit. The results of this study and of earlier investigations of the UDOFTT provided a basis for planning a series of pilot training experiments. The methodology, rationale, and design of these experiments were oriented toward effective use of the UDOFTT to establish the extent to which reductions in the degree of simulation affects piloting performance and the amount of transfer of training. (Author)
AD-471 806 HC$3.00 MF$0.65

THE PROBLEM OF TEMPORAL ORDER IN STIMULATION AND PERCEPTION,
Cornell Univ., Ithaca, N. Y. Graduate Psychological Labs.
James J. Gibson. 19 Jan 66, 9p
Contract Nonr-401 (14)
Presented at the Eastern Psychological Association, Apr 65.
Availability: Published in The Journal of Psychology v62 p141-9 1966.

Descriptors: (*Memory, *Perception (Psychology)), Learning, Nervous system, Theory, Recall, Time.

The concept of memory in its relation to perception is considered. Acceptance of sequential perception rather than momentary pattern-perception is suggested. If perception involves the apprehension of a changing world, not a frozen one, the problem is that of detecting invariants under transformation. The permanence can be isolated just because the perspectives change. The latter do not have to be stored up and put together in a composite. The mechanism of perceptual learning is one in which the nervous system resonates to the invariants of the stimulus flow, as Lashley suspected, not one of storage and retrieval of engrams. The recalling of the past, the capacity (in some persons) to summon memory images into consciousness, may well be a quite incidental accompaniment of learning, not its basis. (Author)
AD-643 480 Not available from CFSTI.

CROSS-CULTURAL INVARIANCE IN THE DIFFERENTIATION AND ORGANIZATION OF FAMILY ROLES,
Illinois Univ., Urbana.
Uriel G. Foa, Harry C. Triandis, and Evelyn Walker Katz. 20 Sep 65, 13p
Contract Nonr-1834 (36)
Availability: Published in Journal of Personality and Social Psychology v4 n3 p316-27 1966.

Descriptors: (*Social psychology, *Culture), Children, Adults, Learning, Behavior, Personality.
Identifiers: Families.

A theoretical analysis of family-role development is proposed and tested in 4 cultures. The child 1st learns to differentiate between self and others, as actors and objects of behavior; then he learns to differentiate by sex (same-different) and by generation (parents-different, siblings-same generation).

This analysis suggests formal hypotheses of circular orders of correlation for family roles, such as brother-brother, father-son, mother-son, wife-husband, son-mother, and son-father. The hypotheses were tested with 2 sets of data: (a) judgments of whether a particular behavior is appropriate for members of S's culture when it occurs between the actor and object specified by a role obtained from American, Greek, Hawaiian-Japanese, and Japanese Ss and analyzed separately for the 4 cultures, and (b) content analyses of the behaviors occurring between family members as portrayed in 50 American short stories. The results suggest that the proposed order of roles appears in different cultures. (Author)
AD-643 584 Not available from CFSTI.

SPONTANEOUS AND SUGGESTED POSTHYPNOTIC AMNESIA.
Interim rept.,
Stanford Univ., Calif. Lab. of Hypnosis Research.
Ernest R. Hilgard, and Leslie M. Cooper. 21 Apr 65, 16p
AFOSR-66-2207
Contract AF 49 (638)-1436
Availability: Published in The International Journal of Clinical and Experimental Hypnosis v13 n4 p261-73 1965.

Descriptors: (*Hypnosis, Recall), Mental disorders, Memory.
Identifiers: Amnesia.

The investigation was carried out to obtain comparable figures on the prevalence of spontaneous and suggested posthypnotic amnesia. Ninety-one introductory psychology students were randomly assigned to 1 of 2 groups, and were required to serve as Ss for two consecutive days. The standard induction of the Stanford Hypnotic Susceptibility Scale, Form A was used on the first day, and that of Form B on the second. Suggestibility items were then presented and served to apprise susceptibility and to test for amnesia. For 1 group, spontaneous amnesia was tested on the first day, and suggested amnesia on the second day. This order was reversed for the second group. Using as evidence of amnesia that 4 or fewer of the 10 possible items were recalled, 6 (7%) showed spontaneous amnesia on one of the two days, while a significantly larger number 32 (35%), showed suggested amnesia. When the groups were subdivided on the basis of susceptibility scores, it was found that there is a marked advantage for suggested amnesia over spontaneous amnesia for highly susceptible hypnotic Ss, while this difference essentially disappears for low Ss. It was further found that (a) suggested amnesia is significantly greater than spontaneous amnesia whether or not one follows the other, (b) there is a small effect of the suggested posthypnotic amnesia for all levels of susceptibility, but this becomes pronounced with susceptibility scores of 6 and above, (c) the highly susceptible hypnotic Ss show no more spontaneous posthypnotic amnesia than do others. While there may be a small amount of spontaneous amnesia, this amount, if any, is small compared with suggested amnesia. (Author)
AD-643 591 Not available from CFSTI.

AN EVENT SELECTOR FOR SEQUENTIAL CONTROL.
Interim rept.,
Michigan Univ., Ann Arbor.
Harold T. Salive, and David E. Carter. 1966, 4p
AFOSR-66-2383
Contract AF 49 (638)-367
Prepared in cooperation with Columbia Univ.
Availability: Published in Psychon. Sci. v5 n2 p71-2 1966.

Descriptors: (*Control sequences, Circuits), (*Psychometrics, Test equipment), Auditory signals, Visual signals, Automatic, Selection, Reaction (Psychology), Switching circuits.

A circuit using a stepping switch coupled to a number of rotary selector switches is suggested as a general solution to the problem of programming sequential events automatically. A number of applications are discussed including the programming of visual and auditory stimuli and the recording of responses under several different conditions. (Author)
AD-643 602 Not available from CFSTI.

SENSORY INTERACTION: CONTROL OF AUDITORY DISCRIMINATION BY VISUAL STIMULATION IN THE PIGEON.
Interim rept.,
Michigan Univ., Ann Arbor.
Harold T. Salive, Robert B. Zajonc, and David E. Carter. 14 Jun 66, 6p
AFOSR-66-2382
Contract AF 49 (638)-367
Prepared in cooperation with Columbia Univ.
Availability: Published in Perception and Psychophysics v1 p242-44 1966.

Descriptors: (*Sensory perception, *Conditioned reflex), Pigeons, Visual signals, Auditory perception, Reaction (Psychology), Probability, Psychophysiology.

Two pigeons were trained to peck at different keys, each associated with a different tone intensity. Although the test tones were of the same intensity as those used during training, simultaneous presentation of a light with the tone altered the probability of correct key choice in the same manner as increasing the intensity of the tone. (Author)
AD-643 603 Not available from CFSTI.

A CONTINUOUS-RESPONSE TASK WITH NONDETERMINATE, CONTINGENT REINFORCEMENT.
Interim rept.,
Stanford Univ., Calif. Inst. for Mathematical Studies in the Social Sciences.
Patrick Suppes, and Joseph L. Zinnes. 24 Nov 64, 22p
AFOSR-66-2147
Contract AF 49 (638)-1253, Grant AF-AFOSR-62-384
Availability: Published in Journal of Mathematical Psychology v3 n1 p197-216 Feb 1966.

Descriptors: (*Performance (Human), Sequential analysis), Behavior, Target acquisition, Performance tests, Probability, Distribution functions, Statistical tests, Numerical methods and procedures, Integral equations, Transformations (Mathematics), Reaction (Psychology).
Identifiers: Reinforcement (Psychology).

An experiment dealing with a continuous-response task with nondeterminate contingent reinforcement is analyzed in detail. The subject's task was to attempt to hit a target located at a variable position on the circumference of a circle. The subject could not see this target but was simply told after each response whether he had hit or missed the target. The sixty subjects were randomly assigned to one of two groups, the only difference in the groups being the size of the target. The asymptotic response data are analyzed with respect to three different one-element models. Only one of these three models, the identity model, is at all satisfactory. For the analysis of sequential data this model is extended to an N-element version. (Author)
AD-643 612 Not available from CFSTI.

COGNITIVE ASPECTS OF PSYCHOMOTOR PERFORMANCE: THE EFFECTS OF PERFORMANCE GOALS ON LEVEL OF PERFORMANCE,
American Institutes for Research, Silver Spring, Md.
Edwin A. Locke, and Judith F. Bryan. 17 May 65, 7p
Contract Nonr-4792 (00)
Availability: Published in Journal of Applied Psychology v50 n4 p286-91 1966.

Descriptors: (*Psychometrics, Performance (Human)), (*Performance (Human), Applied psychology), Standards, Reaction (Psychology), Group dynamics, Motivation, Learning, Memory.

An experiment stemming from Mace's work on the effects of performance is standards on level of performance is reported. It was found that Ss given specific (but difficult) standards performed at a higher level on a complex psychomotor task than Ss told to 'do their best,' thus replicating Mace's finding with a computation task. In contrast to Mace's study where performance goals worked by prolonging effort during the latter part of the work periods, the standards intensified effort at all stages of the work periods in the present case.
AD-643 679 Not available from CFSTI.

THE EFFECTS OF GOAL-SETTING, RULE-LEARNING, AND KNOWLEDGE OF SCORE ON PERFORMANCE,
American Institutes for Research, Silver Spring, Md.
Edwin A. Locke, and Judith F. Bryan. 20 Sep 65, 7p
Contract Nonr-4792 (00)
Availability: Published in The American Journal of Psychology v79 n3 p451-7 Sep 1966.

Descriptors: (*Learning, Performance (Human)), (*Performance (Human), Applied psychology), Memory, Behavior, Training, Reaction (Psychology), Reflexes, Motivation, Psychometrics.

An hypothesis of the present investigation was that one possible mechanism might be the setting of performance goals that could influence level of effort. In other words, without changing the knowledge of the correctness or incorrectness of the answers to each problem, the knowledge of total score on a trial or series of trials would influence the performance goals the individual set for himself.
AD-643 681 Not available from CFSTI.

STUDENT OFFICER ATTITUDES TOWARD THE AIR FORCE,
Baylor Univ., Waco, Tex. Dept. of Psychology.
For primary bibliographic entry see Field 5I.
AD-643 686 HC$3.00 MF$0.65

EFFECTS OF REALISTIC STRESS AND PROCEDURAL INTERFERENCE IN EXPERIMENTAL LIE DETECTION.
Interim rept.,
Hebrew Univ., Jerusalem (Israel).
Sol Kugelmass, and Israel Lieblich. 1 Feb 65, 8p
AFOSR-66-2384
Contract AF 61 (052)-839, Grant AF-AFOSR-61-63
Availability: Published in Journal of Applied Psychology v50 n3 p211-6 1966.

Descriptors: (*Lie detectors, Effectiveness), (*Stress (Psychology), Galvanic skin response), Interference, Blood pressure, Criminology, Israel.

Two different samples of police trainees were used to investigate: (a) the effect of realistic stress in experimental lie detection, (b) the possible interference with the GSR channel resulting from the simultaneous recording of blood pressure. It was found that: (a) GSR detection results under stress were essentially similar to those obtained in mild experimental situations, and far superior in detection efficiency to analysis of heart rate changes. (b) The introduction of a blood-pressure cuff inflated to 80 mm. Hg for the 90 sec. of interrogation (similar to actual field measurement conditions) reduced the efficiency of detection of the GSR

channel. (c) There is some suggestion that GSR reactivity may be related to ethnic origin. (Author)
AD-643 707 Not available from CFSTI.

FACTOR ANALYSIS OF CATEGORY AND MAGNITUDE SCALES OF A TECHNICAL ATTRIBUTE,
Applied Psychological Services, Wayne, Pa.
Arthur I. Siegel, and Mark G. Pfeiffer. 16 Jul 65, 8p
Contract Nonr-2279 (00)
Availability: Published in Journal of Applied Psychology v50 n4 p341-7 Aug 1966.

Descriptors: (*Decision making, Factor analysis), Psychometrics, Scale, Circuits, Perception (Psychology), Maintenance personnel, Electronics, Classification.

36 journeymen electronics maintenance personnel judged the complexity of 16 avionics circuits using the paired-comparison, magnitude-estimation, rank-order, and constant-sum procedures on 2 occasions. The basic scale values were standardized across the 16 circuits separately within each method and occasion. The standardized scale values were then intercorrelated and factor analyzed to test the hypothesis that 2 factors would account for the data. After considering 1-, 2-, 3-, and 4-factor solutions, a 2-factor solution was chosen as best fitting the data. These 2 factors suggested the taxonomy of 'cognitive discrimination' and 'contextual uncertainty' to account for Ss' scaling behavior. Most frequently, the paired-comparison and the constant-sum methods were most heavily loaded on Factor 1, 'cognitive discrimination.' The rank-order and the magnitude-estimation methods were most consistently loaded heaviest on 'contextual uncertainty,' Factor 2. The findings are interpreted in terms of their relationship to certain customary scaling classificatory schemes. (Author)
AD-643 725 Not available from CFSTI.

A SECOND STUDY OF FACTORS AFFECTING AIRCREW MORALE.
Rept. for Jan-Jun 66,
School of Aerospace Medicine, Brooks AFB, Tex.
Bryce O. Hartman, George K. Cantrell, and Lewis Sims, Jr. Nov 66, 19p SAM-TR-66-91

Descriptors: (*Flight crews, Group dynamics), (*Naval personnel, Flight crews), Attitudes, Job analysis, Applied psychology, Effectiveness, Personnel management, Reaction (Psychology), Officer personnel, Aviation medicine.

A questionnaire concerning aircrew morale and job-satisfaction was completed by 283 officers and 138 enlisted aircrewmen in three Military Airlift Command Navy squadrons. The stability and predictability of off-duty time, with emphasis on scheduled time off-duty and elimination of wasted time on-duty, were an area of major concern to the Navy aircrewmen. Officers and enlisted men expressed essentially the same attitudes. Responses were generally more moderate than in an earlier study with Air Force aircrewmen. Satisfactions derived from flying apparently attenuated negative feelings to a considerable extent.
AD-643 820 HC$3.00 MF$0.65

ILLUMINATION IN THE ATTACK CENTER AND PERISCOPE AREA OF THE SS 563/564.
Dunlap and Associates, Inc., Stamford, Conn.
For primary bibliographic entry see Field 13J.
AD-643 828 HC$3.00 MF$0.65

A STUDY OF SELECTED FACTORS AFFECTING THE MEASUREMENT OF TOTAL TEAM PRODUCT IN GUNFIRE SUPPORT TRAINING.
Technical rept.,
Ohio State Univ. Research Foundation, Columbus.
John E. Horrocks, Emil Heermann, and Michael Kalk. 25 Nov 59, 20p
NAVTRADEVCEN-1939-0-4
Contract Nonr-1939 (00)

Descriptors: (*Group dynamics, Gunnery), (*Gunnery, Naval personnel), Errors, Statistical analysis, Learning, Training, Performance (Human), Human engineering.

The hypotheses tested by this investigation are: The correlation of related team measures is significantly reduced due to a cancelling-out effect of individual components operative in range and bearing problems. When cancelling-out effects are reduced or eliminated, prediction of future team product, in training or an operational situation, will increase. With cancelling-out effects reduced, it will be possible to predict future performance from a smaller number of trials.
AD-643 830 HC$3.00 MF$0.65

TARGET DETECTION PERFORMANCE WITH A BOWTIE RADAR DISPLAY.
Human Factors Research, Inc., Santa Barbara, Calif.
For primary bibliographic entry see Field 17I.
AD-643 893 Not available from CFSTI.

SELF-STIMULATION IN PIGEONS: THE PROBLEM OF 'PRIMING',
Oxford Univ. (England). Inst. of Experimental Psychology.
Euan M. Macphail. 24 Oct 66, 4p
AFOSR-66-2426
Grant AF-EOAR-2-64
Availability: Published in Journal Psychon Sci v5 n1 p7-8 1966.

Descriptors: (*Conditioned reflex, Stimulation), Pigeons, Learning, Response, Reaction (Psychology), Food, Appetite, Thirst, Brain, Electric currents, Great Britain.

In an experiment designed to investigate the roles of deprivation and priming in self-stimulation in pigeons, two of eight birds for which electrical stimulation of the brain (ESB) had previously been shown to be rewarding self-stimulated at good rates irrespective of state of deprivation or priming. The other six birds responded poorly whether satiated, hungry, or thirsty, despite the delivery of externally paced priming shocks. It is concluded that self-delivered ESB is more effective than externally-paced ESB in initiating self-stimulation; this is taken to be a consequence of the interaction of rewarding and aversive effects of ESB. (Author)
AD-644 132 Not available from CFSTI.

GEOGRAPHIC AND ASTRONOMIC DISTANCE RESPONSES BY RATED OFFICERS,
School of Aerospace Medicine, Brooks AFB, Tex.
For primary bibliographic entry see Field 6N.
AD-644 155 HC$3.00 MF$0.65

SOME CHARACTERISTICS OF TECHNICAL ENTREPRENEURS.
Massachusetts Inst. Of Tech., Cambridge. Alfred P. Sloan School Of Management.
E. B. Roberts, and H. A. Wainer. May 66, 32p
NASA-CR-77278, REPT.-195-66
Grants NSG-235, NSG-496

Descriptors: *Education, *Motivation, Background, Environment, Family, Goal, Orientation, Psychology, Technical, Training.

For abstract, see STAR 05 02.
N67-11965 HC$3.00 MF$0.65

SHORT PERIOD FLUCTUATIONS IN INTELLIGENCE FINAL REPORT.
Denver Univ., Colo.
Sep 66, 57p NASA-CR-79740
Grant NSG-518

Descriptors: *Human performance, *Intelligence, *Psychometrics, Analysis, Data, Fluctuation, Human, Male, Method, Pattern, Performance, Stability, State, Test.

For abstract, see STAR 05 02.
N67-12067 HC$3.00 MF$0.65

5K. SOCIOLOGY

ANNOTATED BIBLIOGRAPHY OF CRESS PUBLICATIONS.
American Univ., Washington, D. C. Center for Research in Social Systems.
Aug 66, 28p
Contract DA-49-092-ARO-7

Descriptors: (*Social sciences, Reports), Bibliographies, Abstracts, Periodicals, Scientific research, Indexes, Handbooks, Counterinsurgency, Military psychology, Unconventional warfare, Culture, Sociology.

An annotated listing is given of all CRESS unclassified publications through July 1966. The bibliography is indexed by author and by country or area. (Author)
AD-643 543 HC$3.00 MF$0.65

CROSS-CULTURAL INVARIANCE IN THE DIFFERENTIATION AND ORGANIZATION OF FAMILY ROLES,
Illinois Univ., Urbana.
For primary bibliographic entry see Field 5J.
AD-643 584 Not available from CFSTI.

EFFECTS OF REALISTIC STRESS AND PROCEDURAL INTERFERENCE IN EXPERIMENTAL LIE DETECTION.
Hebrew Univ., Jerusalem (Israel).
For primary bibliographic entry see Field 5J.
AD-643 707 Not available from CFSTI.

CIVIL DEFENSE AND SOCIETY.
Pittsburgh Univ., Pa. Dept. of Sociology.
For primary bibliographic entry see Field 15C.
AD-643 719 HC$3.00 MF$0.65

SOCIAL SCIENCES INFORMATION SYSTEMS WORKSHOP PROCEEDINGS.
American Univ., Washington, D. C. Center for Research in Social Systems.
Hans C. Ullmann, and Victor F. Shauklas. Nov 66, 113p
Contract DA-49-092-ARO-7
Proceedings of workshop, Airlie Foundation, Warrenton, Va. 8-11 May 66.

Descriptors: (*Social sciences, Documentation), (*Information retrieval, Social sciences), Technical information centers, Indexes, Subject indexing, Data storage systems, Abstracts, Scientific research, State-of-the-art reviews, Symposia.

The proceedings are the result of a three-day workshop entitled, 'Social Sciences Information Systems,' held at the Arlie Foundation, Warrenton, Virginia, May 1966. The workshop was co-sponsored by the Center for Research in Social Systems (at that time the Special Operations Research Office) of The American University and the System Development Corporation. The workshop proceedings record the exploring of the application of information sciences and technology to the problems of research and practice in the social sciences and record some of the results of the exploration, among which is the realization that startling further advances in social science information systems are within the state-of-the-art if sufficient

concerted effort and resources are devoted to their achievement. (Author)
AD-643 990 HC$3.00 MF$0.65

A STUDY OF CALL-BACK POLICIES IN SAMPLE SURVEYS.
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
For primary bibliographic entry see Field 12A.
AD-644 017 HC$3.00 MF$0.65

A NOTE ON EQUILIBRIUM SYSTEMS FROM A DIALECTICAL (TENSIONAL) POINT OF VIEW.
California Univ., Berkeley. Space Sciences Lab.
T. A. Cowan. Oct 66, 28p NASA-CR-80089
Grant NSG-243-62
Its Internal Working Paper No. 50

Descriptors: *Equilibrium, *Feedback, *Philosophy, *University program, Behavior, Decision, Information, Input, Model, Morphology, Observation, Output, Program, System, Tension, University.

For abstract, see STAR 05 02.
N67-12259 HC$3.00 MF$0.65

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. BIOCHEMISTRY

DARK AND PHOTOMETABOLISM OF SUGARS BY A BLUE GREEN ALGA: TOLYPOTHRIX TENUIS,
Brandeis Univ., Waltham, Mass. Dept. of Biology.
Wai Yiu Cheung, and Martin Gibbs. 21 Oct 65, 9p
AFOSR-66-2086
Contract AF 49 (638)-798
Supported in part by NSF.
Availability: Published in Plant Physiology v41 n4 p731-7 Apr 1966.

Descriptors: (*Algae, Carbohydrates), (*Carbohydrates, Metabolism), Glucose, Polysaccharides, Ribose, Fructoses, Oxygen consumption, Labeled substances, Photosynthesis, Glycolysis, Inhibition, Antimetabolites, Respiration.

The carbohydrate metabolism of the autotrophically grown blue-green alga, Tolypothrix tenuis, was studied. The alga respires glucose, fructose, galactose, and ribose. About 60% of the blucose consumed is converted by starved cells into a glucose polysaccharide. Glucose uptake and O2 consumption are not inhibited by 0.01 M arsenite or by 0.005 M iodoacetamide. The distribution of 14C in the polysaccharide glucose was established after feeding of glucose-1-14C, -2-14C, -6-14C, ribose-1-14C, and fructose-6-14C. Randomization of isotope between the 2 halves of the glucose from polysaccharide is limited when the experiments are carried out in the dark. After an extended incubation glucose-2-14C yields a glucose molecule with isotope labeled approximately equal in C-1, C-2 and C-3. When the labeled glucoses were fed at a light intensity of compensation point, and in the presence of carbon dioxide, a greater degree of randomization of isotope occurred. The enhanced randomization of isotope is thought to result from an additional supply of triose phosphates as a result of photosynthesis which creates an environment favorable to the reversal of the glycolytic reactions. To account for the labeling patterns and the resistance of respiration to the inhibitors, it is proposed that the oxidative pentose phosphate cycle is the major pathway of carbohydrate breakdown in this alga. (Author)
AD-643 604 Not available from CFSTI.

REGULATION OF PHOTOSYNTHETIC CAPACITY IN CHLAMYDOMONAS MUNDANA.
Interim rept.,
Brandeis Univ., Waltham, Mass. Dept. of Biology.
George K. Russell, and Martin Gibbs. 28 Dec 65, 8p
AFOSR-66-2087
Contract AF 49 (638)-798
Supported in part by NSF.
Availability: Published in Plant Physiology v41 n5 p885-90 May 1966.

Descriptors: (*Algae, Photosynthesis), (*Photosynthesis, Control systems), Saccharide phosphates, Carbon dioxide, Carbohydrates, Enzymes, Inhibition, Organic pigments, Growth, Sodium compounds, Acetates.

A regulatory system is described in the obligately phototrophic green alga Chlamydomonas mundana. Cells grown in acetate media are unable to fix carbon dioxide in the light but carry out a photoassimilation of acetate to carbohydrate; cells cultured with carbon dioxide as the sole source of cellular carbon carry out typical green plant photosynthesis. The control appears to take place at the level of the reductive pentose phosphate cycle. The presence of sodium acetate in the medium strongly inhibits formation of ribulose-1,5-diphosphate carboxylase, ribulose-5-phosphate kinase and one of the 2 fructose-1,6-diphosphate aldolase activities of the cell. Ribose-5-phosphate isomerase is present in higher activity in autotrophic cells. Changes in the levels of triose phosphate dehydrogenase were also noted. The total pigment content of the cell and the photosynthetic electron transport reactions are not altered under different conditions of growth. (Author)
AD-643 605 Not available from CFSTI.

A RAPID MICROANALYSIS OF NITROGEN IN ORGANIC COMPOUNDS SLEEVE-TUBE COMBUSTION METHOD,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7C.
AD-643 708 HC$3.00 MF$0.65

SEVEN NEW HUMAN SERUM FACTORS PRESUMABLY SUPPORTED BY THE GAMMA-GLOBULINS,
California Univ., San Francisco. Medical Center.
C. Ropartz, L. Rivat, P. -Y. Rousseau, H. H. Fudenberg, and R. Molter. 1966, 4p
Contract Nonr-3656 (12), Grant PHS-AM-0527
Prepared in cooperation with Centre Departemental de Transfusion Sanguine et de Genetique Humaine, Rouen, Serum Institut, Heidelberg, and Centre Departmental de Transfusion Sanguine, Paris.
Availability: Published in Vox Sanguinis v11 p99-102 1966.

Descriptors: (*Gamma globulin, Blood serum), Immune serums, Identification, Test methods, Inhibition, Antigens + antibodies, Genetics, Humans.
Identifiers: Antiglobulin serums.

During a systematic search for anti-Gm and anti-Inv reagents, a number of human antiglobulin sera with unknown specificities were found. An exhaustive study of the antigens defined by the new agglutinators is currently in progress. A brief description of some of their characteristics is given. (Author)
AD-643 723 Not available from CFSTI.

APPARENT GENOMIC MAPPING OF STAPHYLOCOCUS AUREUS BY A NEW METHOD.
Fort Detrick, Frederick, Md.
For primary bibliographic entry see Field 6M.
AD-643 748 Not available from CFSTI.

THE IDENTICAL STRUCTURE ANOMALIES OF HEMOGLOBINS J MEINUNG AND J KORAT.
Technical rept.,
Naval Medical Research Unit No. 2, Taipei (Taiwan). Dept. of Biochemistry.
R. Quentin Blackwell, and Chen-Sheng Liu. 2 Aug 66, 11p
NAMRU-2-TR-248, NAVMED-MF022.03.07-2004.15
Availability: Published in Biochemical and Biophysical Research Communications v24 n5 p732-8 1966.

Descriptors: (*Hemoglobin, Anomalies), Genetics, Electrophoresis, Amino acids, Peptides, Blood chemistry, Taiwan.

Fast hemoglobins with the anodal mobility of J hemoglobin were found during 1962 in members of a Hakkanese Chinese family in Meinung, Taiwan and a Thai family near Korat, Thailand. Recent studies have revealed additional families in Thailand and in Taiwan with the fast hemoglobins. Chemical studies have shown that J Meinung and J Korat have the same structural anomaly. In each case the molecule has replacement of the glycyl residue at position 56 in the beta chains by aspartyl residues. Both J Meinung and J Korat can be designated as alpha A/2 beta 56/2 Asp. (Author)
AD-643 838 Not available from CFSTI.

DETERMINATION OF INFLIGHT BIOCHEMICAL RESPONSES UTILIZING THE PAROTID FLUID COLLECTION TECHNIC,
School of Aerospace Medicine, Brooks AFB, Tex.
For primary bibliographic entry see Field 6E.
AD-643 883 Not available from CFSTI.

INCORPORATION OF C1 UNITS INTO ALLULOSE PHOSPHATE BY METHANE-GROWN PSEUDOMONAS METHANICA,
Sheffield Univ. (England). Dept. of Biochemistry.
M. B. Kemp, and J. R. Quayle. 15 Jun 65, 6p
AFOSR-66-1882
Grant AF-EOAR-8-64
Availability: Published in Biochim Biophys Acta v107 p174-6 1965.

Descriptors: (*Pseudomonas, Phosphates), Saccharide phosphates, Methanols, Methane, Growth, Radioactivity, Phosphorylation, Bacterial extracts, Formaldehyde, Carbon compounds, Labeled substances, Great Britain.

Studies of the incorporation of 14C methane and 14C methanol into Pseudomonas methanica growing on methane, or 14C methanol into the same organism growing on methanol, have shown that over 90% of the radioactivity fixed at the earliest times of sampling appears in phosphorylated compounds. Glucose phosphate and fructose phosphate together constitute the largest part of the radioactive phosphates (70-90%); phosphoglycerate is a relatively minor component (2-17%). These results suggest that a direct incorporation of C1 units into hexose phosphate occurs in P. methanica during growth on methane or methanol. This communication presents evidence that cell-free extracts of methane-grown P. methanica can catalyze the condensation of formaldehyde with ribose 5-phosphate to form allulose (psicose) phosphate. (Author)
AD-643 915 Not available from CFSTI.

THE DEGREE OF COUPLING AND THE IMMUNOGENICITY OF p-AZOBENZENEARSONATE CONJUGATES OF POLY-L-TYROSINE,
Weizmann Inst. of Science, Rehovoth (Israel). Section of Chemical Immunology.
Felix Borek, and Yehudit Stupp. 1966, 4p
AFOSR-66-2595
Grant AF-EOAR-22-64
Availability: Published in Immunochemistry v3 p339-40 1966.

Descriptors: (*Tyrosine, Proteins (Conjugated)), (*Proteins (Conjugated), Antigens + antibodies), (*Immunity, Tyrosine), Allergy, Guinea pigs, Molecular association, Molecular properties, Israel.
Identifiers: Haptens, Para-azobenzenearsonate.

Immunogenicity of p-azobenzene-poly-L-tyrosine conjugates is primarily a function of their degree of substitution, but not of their molecular size. (Author)
AD-644 060 Not available from CFSTI.

INULIN AND PAH STABILITY IN FROZEN PLASMA UTILIZING AN IMPROVED AUTOMATED INULIN TECHNIC.
Technical rept.,
School of Aerospace Medicine, Brooks AFB, Tex.
Rosemary J. Cheek, Joe C. Nichols, and Bruce H. Warren. Nov 66, 17p SAM-TR-66-93

Descriptors: (*Kidney function tests, Inulin), (*Inulin, Chemical analysis), (*Blood plasma, Inulin), Test methods, Blood chemistry, Automation, Statistical analysis, Stability.
Identifiers: Para-aminohippurate.

A stability study of inulin and PAH in frozen plasma is presented. The investigation, including data collected over 30 consecutive days from the analyses of aliquots of a pool of human plasma, supports the conclusion that the concentrations remained the same. In addition, a more precise automated inulin technic is discussed. The modifications included a change in the sampling procedure. (Author)
AD-644 156 HC$3.00 MF$0.65

MOLECULES AND EVOLUTION.
California Univ., Berkeley.
T. H. Jukes. 1966, 293p NASA-CR-79389
Grant NSG-479

Descriptors: *Biochemistry, *Deoxyribonucleic acid (dna), *Evolution, *Genetic code, Code, Cytochrome, Genetics, Hemoglobin, Homology, Microbiology, Molecule, Mutation, Protein, Synthesis.

For abstract, see STAR 05 02.
N67-11400 HC$3.00 MF$0.65

PHYSICS OF CELLULAR SYNTHESIS, GROWTH AND DIVISION PROGRESS REPORT, APR. 1 - SEP. 30, 1966.
Pennsylvania State Univ., University Park. Dept. Of Biophysics.
7 Nov 66, 21p NASA-CR-79921
Grant NSG-324

Descriptors: *Biological cell, *Cell division, *Nucleosynthesis, *Radiobiology, Acid, Amino, Atom, Bacteria, Biological, Biophysics, Cell, Division, Growth, Hydrogen, Molecule, Nucleus, Pressure, Synthesis, Thymine, Tritium.

For abstract, see STAR 05 02.
N67-11851 HC$3.00 MF$0.65

CHEMISTRY OF LIVING SYSTEMS SEMIANNUAL REPORT, MAY 1 - SEP. 30, 1966.
California Univ., Berkeley. Space Science Lab.
T. H. Jukes. 30 Sep 66, 18p NASA-CR-79738
Grant NSG-479
Its Ser. No. 7, Issue No. 60

Descriptors: *Adaptation, *Biochemistry, *Biogenesis, Bacteria, Deoxyribonucleic acid (dna), Development, Environment, Extreme, Heredity, Life, Mechanism, Optical, Origin, Protein, Ribonucleic acid (rna).

For abstract, see STAR 05 02.
N67-12256 HC$3.00 MF$0.65

6B. BIOENGINEERING

DYNAMICS OF THE SACCADIC EYE-MOVEMENT MECHANISM,
Frank J. Seiler Research Lab., Air Force Academy, Colo.
Gerald Cook, and Lawrence Stark. 1965, 7p
SRL-66-0002
Availability: Published in Proceedings of the Bio-Medical Engineering Symposium, Marquette Univ., Milwaukee, Wisconsin, Jun 1965.

Descriptors: (*Eye, Motion), Mathematical models, Muscles, Behavior, Programming (Computers), Tracking.
Identifiers: Saccades.

The dynamic behavior of the human eye-positioning mechanism is investigated. A model for this system is presented. Experimental behavior is compared with model simulations. Results support the validity of the model. (Author)
AD-643 579 Not available from CFSTI.

DC ELECTROMAGNETIC BLOOD FLOWMETER,
California Univ., Los Angeles. Brain Research Inst.
R. T. Kado, and S. T. Schy. 1965, 3p
AFOSR-66-1130
Contract AF 49 (638)-1387
Availability: Published in Digest of the International Conference on Medical Electronics and Biological Engineering (6th), 1965, Tokyo.

Descriptors: (*Flowmeters, *Blood), Electrocardiography, Electromagnetism, Blood circulation, Blood vessels, Blood pressure.
AD-643 758 Not available from CFSTI.

DEVELOPMENT OF AN INCREASED SAMPLING RATE MONITORING SYSTEM.
Sandia Corp., Albuquerque, N. Mex.
J. C. Mashburn, and W. J. Whitfield. Oct 66, 9p
NASA-CR-79537, SC-RR-66-585
NASA ORDER R-09-019-040

Descriptors: *Clean room, *Monitor, *Sampling device, Airborne, Clean, Concentration, Counter, Device, Filter, Flow, Laminar, Leakage, Low, Particle, Rate, Room, Sampling.

For abstract, see STAR 05 02.
N67-11693 HC$3.00 MF$0.65

INSTANTANEOUS MONITORING OF MULTICOMPONENT EXPIRED GASES.
Geophysics Corp. Of America, Bedford, Mass.
A. E. Barrington. Dec 66, 18p NASA-CR-619
Contract NAS4-830

Descriptors: *Expired air, *Gas analyzer, *Mass spectrometer, *Spacecraft instrumentation, Air, Analyzer, Deflection, Expiration, Factor, Flight, Gas, Instrumentation, Ion, Magnetic, Mass, Sensor, Spacecraft, Spectrometer, Time, Weight.

For abstract, see STAR 05 02.
N67-11821 HC$3.00 MF$0.65

6C. BIOLOGY

HISTOCHEMICAL LOCALIZATION OF MONOAMINES IN THE NERVOUS SYSTEM OF THE POLYCHAETE NEPHTYS.
Interim rept.,
Lund Univ. (Sweden).
Mary E. Clark. 7 Apr 66, 23p
AFOSR-66-2825
Grant AF-EOAR-14-66
Prepared in cooperation with Bristol Univ. (England). Dept. of Zoology. Revision of manuscript submitted 26 Nov 65.
Availability: Proceedings of the Royal Society B v165 p308-25 1966.

Descriptors: (*Aquatic animals, Nervous system), (*Nervous system; Amines), (*Amines, Histological techniques), Fluorescence, Serotonin, Nerve cells, Peripheral nervous system, Central nervous system, Ganglia, Methylene blue, Sweden.

A specific fluorescence method was used for the cellular demonstration of biogenic monoamines in the nervous system of Nephytys. The central nervous system contains both green fluorescent (adrenergic) and yellow fluorescent (5-hydroxytryptaminergic) fibres and neurons, the neurons showing a repetitive pattern in successive segments in the nerve cord. The proportion of yellow neurons is much higher in the ventral nerve cord, while the green neurons predominate in the supraoesophageal ganglion. Many of the fluorescent fibres in the neuropile are bearded. Three of the four segmental nerves carry fluorescent fibres peripherally. Except for a yellow neuron in the wall of the intestine, all peripheral fluorescent cells are green. Of these, a few in each segment are located in peripheral ganglia, and the result resemble the bi-polar epidermal sensory cells found in other polychaetes. The only yellow fibres visible peripherally are the multiple varicosities which occur at points of muscle insertions on basement membranes. It is possible that these are the end plates of a set of motor fibres. On the basis of the distribution and morphology of structures exhibiting the two types of fluorescence it is postulated that the green system may have a sensory and the yellow system a motor function. (Author)
AD-643 501 Not available from CFSTI.

ON THE SAVANNA VEGETATION OF CALABOZO, VENEZUELA AND RUPUNUNI, BRITISH GUIANA.
Technical rept. on Savanna Research Project,
McGill Univ., Montreal (Quebec). Dept. of Geography.
R. J. A. Goodland. Nov 66, 20p TR-5, Research Series-4
Contract Nonr-3855 (00)
Availability: Published in Boletin de la Sociedad Venezolana de Ciencias Naturales v26 n110 p343-59 Jun 1966.

Descriptors: (*Plants (Botany), South America), (*Venezuela, Plants (Botany)), (*British Guiana, Plants (Botany)), Grasses, Ecology, Trees, Climatology, Maps, Distribution, Forestry, Fires, Bibliographies.

A brief comparison is made between the savanna vegetation at Calabozo, Venezuela with that at Rupununi, Guyana, with a short section on fire and a bibliography. Both areas are Trachypogon spp. (with Andropogon and Paspalum) grasslands with low overall density of stunted, gnarled trees, often the Curatella-Byrsonima crassifolia association. The two lists of species are briefly discussed and compared in tables of major families, major genera (both with numbers of species) major nonwoody herbs, major trees (with frequency, occurrence, etc.) and the distribution in South America of some selected trees and herbs. A rough map of the distribution of some South American savannas is presented with a comparative macroclimate diagram. A chart of the savanna 'ecosystem' suggesting the gross relationships of the major factors is presented in the hope that it will provoke comment, criticism and further studies. (Author)
AD-643 506 Not available from CFSTI.

CONDUCTION VELOCITY AND DIAMETER OF NERVE FIBRES OF CEPHALOPODS,
University Coll., London (England). Dept. of Anatomy.

Group 6C—Biology

T. M. O. Burrows, I. A. Campbell, E. J. Howe, and J. Z. Young. 1965, 3p
AFOSR-66-2009
Grant AF-EOAR-42-64
Prepared in cooperation with Zoological Station, Naples (Italy). Presented at the Proceedings of the Physiological Society, 26-27 Mar 65.
Availability: Published in Journal of Physiology v179 p39-40 1965.

Descriptors: (*Cephalopoda, *Nerve fibers), Nerve impulses, Velocity, Physical properties, Neurology, Great Britain, Italy.
Identifiers: Sepia, Octopi, Loligo.

The relationship was tested in Octopus, Sepia and Loligo, including fibres of a range of diameters in each species. Velocity was measured at 20C on nerves kept at their natural lengths. Estimates were from the passage of impulses past at least two points. The smallest fibres were from the salivary duct nerves of Octopus, medium sized fibres were from arm, fin, and mantle nerves of all three species, and the largest, from giant fibres of the stellar nerves of Sepia and Loligo. For the small and medium fibres, measurements were made from the foot of the compound action potential and the diameters of the largest fibres in the nerves were estimated from measurements of fresh and fixed nerves. The action potentials and diameters of the giant fibres were recorded individually. (Author)
AD-643 512 Not available from CFSTI.

AN AUTOMATIC FOOD DISPENSER FOR OCTOPUS VULGARIS.
Interim rept.,
University Coll., London (England). Dept. of Anatomy.
H. J. Coates, R. E. Hussey, and Marion Nixon.
1965, 4p
AFOSR-66-2008
Grant AF-EOAR-42-64
Availability: Published in Journal of Physiology v183 p51-2 1965.

Descriptors: (*Cephalopoda, Ingestion (Physiology)), Automatic, Food, Design, Behavior, Great Britain.

O. vulgaris has been used successfully for many behavioral experiments in which a food reward is given for correct responses. The application of an automatic food reward device may permit an extension of these studies. (Author)
AD-643 513 Not available from CFSTI.

A COMPARISON OF LIVING SEPIOTEUTHIS SEPIOIDEA AND DORYTEUTHIS PLEI WITH OTHER SQUIDS, AND WITH SEPIA OFFICINALIS,
Georgia Univ., Athens. Bioelectronic Computer Lab.
B. B. Boycott. 30 Jun 65, 13p
AFOSR-66-0754
Contract AF 49 (638)-1011
Prepared in cooperation with University Coll., London (England), and Bermuda Biological Station, St. George's West Contrib-373.
Availability: Published in Journal of Zoology v147 p344-51 1965.

Descriptors: (*Cephalopoda, Morphology (Biology)), Ecology, Colors, Behavior, Nervous system, Reproduction (Physiology).

Sepioteuthis is unusual among loliginids in that it has a relatively broad body, fins extending along the length of the mantle, a well developed disruptive pattern and a dynamic response. The resemblances to Sepia are probably convergent associated with the assumption of an ecology similar to that of cuttlefishes. A pattern possibly of display of the ripe testis is described for D. plei and the known chromatic behaviour of loliginids is summarized. (Author)
AD-643 590 Not available from CFSTI.

DARK AND PHOTOMETABOLISM OF SUGARS BY A BLUE GREEN ALGA: TOLYPOTHRIX TENUIS,
Brandeis Univ., Waltham, Mass. Dept. of Biology.
For primary bibliographic entry see Field 6A.
AD-643 604 Not available from CFSTI.

REGULATION OF PHOTOSYNTHETIC CAPACITY IN CHLAMYDOMONAS MUNDANA.
Brandeis Univ., Waltham, Mass. Dept. of Biology.
For primary bibliographic entry see Field 6A.
AD-643 605 Not available from CFSTI.

PSORERGATIC MANGE IN THE SOOTY MANGABEY (CERCOCEBUS TORQUATES ATYS) MONKEY,
Army Medical Research Lab., Fort Knox, Ky. Pathology Div.
Winslow G. Sheldon. 29 Aug 66, 10p
USAMRL-691
Prepared in cooperation with Texas A and M Univ.
Availability: Published in Laboratory Animal Care v16 n3 p276-9 1966.

Descriptors: (*Monkeys, Parasitic diseases), Mites, Skin, Therapy, Diagnosis, Pathology.

Psorergatic mange is described as seen in six sooty mangabey monkeys. Two separate groups of three animals each were affected. The mites were easily found in skin scrapings and treatment with a commercially available acaricide was effective. The condition caused no untoward effect on the animals and apparently was well tolerated. The parasites were located in the very superficial layers of the hyperkeratotic epidermis and no significant inflammatory response of the dermis or subcutaneous tissues was present. (Author)
AD-643 608 Not available from CFSTI.

PULMONARY BLASTOMYCOSIS IN A CAT,
Army Medical Research Lab., Fort Knox, Ky. Pathology Div.
Winslow G. Sheldon. 29 Aug 66, 12p
USAMRL-690
Prepared in cooperation with Texas A and M Univ.
Availability: Published in Laboratory Animal Care v16 n3 p280-5 1966.

Descriptors: (*Cats, Respiratory diseases), (*Blastomyces, Respiratory diseases), Lungs, Pathology, Diagnosis, Biopsy, Histology.

The occurrence of a single case of pulmonary blastomycosis in a domestic feline is reported. The animal exhibited extreme respiratory distress shortly before it was euthanatized. At necropsy, lesions were confined to all of the lobes of the lungs and the mediastinal and bronchial lymph nodes. Identification of the causative organism, Blastomyces dermatitidis, was accomplished by mouse inoculation, cultural and histopathological methods. The gross and histopathological appearance of the lungs and adjacent lymph nodes are described. (Author)
AD-643 609 Not available from CFSTI.

CHANGES IN THE INTESTINES OF MONKEYS CAUSED BY NEMATODA LARVAE OESOPHAGOSTOMUM APIOSTOMUM,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
K. K. Zaitseva. 7 Dec 66, 15p FTD-HT-66-232
TT-67-60210
Unedited rough draft trans. of Arkhiv Patologii (USSR) v27 n3 p70-8 1965.

Descriptors: (*Intestines, Parasitic diseases), (*Nematodes, Digestive system diseases), (*Monkeys, Nematodes), Larvae, Pathology, Sensitivity, USSR.

The results of a postmortem examination of 38 monkeys (Macacus rhesus) are given, in seven of which changes in the large intestine were caused by Oesophagostomum apiostomum larvae. The invasion of the larvae into the intestine wall causes a considerable inflammatory process and the formation of cystlike modules containing larvae in the submucosa and muscular layers. Depending on the time lapse from the moment of invasion and the animal's sensitivity to the parasite the cysts may contain hemorrhagic or purulent exudate. At remote dates from the time of invasion the cysts are subjected to organization and encapsulation. By the character of the inflammatory process developing at the site of the esophagostoma larvae invasion one may assess the time lapse from the moment of invasion as well as the state of body reactivity.
AD-643 635 HC$3.00 MF$0.65

SOME FACTORS CONTROLLING BONE RESORPTION AND FORMATION IN TISSUE CULTURE,
Harvard School of Dental Medicine, Bost0n, Mass.
Paul Goldhaber. 1965, 12p
Contract DA-49-193-MD-2018, Grant PVS-DE-01298

Descriptors: (*Bone, Tissue culture), Oxygen, Culture media, Embryonated egg technique, Calcification, Morphology (Biology), Parathyroid hormones, Vitamin A, Vitamin D.

Oxygen tension in the gas phase of roller-tube cultures of young mouse calvaria plays a major role in determining the rate and extent of response to various bone resorption stimulating factors, such as parathyroid extract, high concentrations of crystalline vitamin A or crystalline vitamin D. Suboptimal concentrations of these factors may be markedly enhanced by the presence of bone resorption stimulating co-factors such as heparin, although here, too, the system is extremely oxygen-dependent. Bone formation takes place only in the presence of chick embryo extract which presumably contains a bone formation stimulating factor as well as a bone resorption stimulating factor. Very slight new osteoid formation occurs at 10% oxygen, but at 20, 30 and 50% oxygen the amounts may be significant. Calcification of the new osteoid may be observed in the living cultures, but occurs more frequently at the higher oxygen tensions. Although the amount of new osteoid formation is comparable at 30% O2 and 50% O2, bone resorption is markedly stimulated at the higher oxygen tension, resulting in an enormous decrease in bone mass. Biochemical studies confirm these morphological observations. (Author)
AD-643 690 HC$3.00 MF$0.65

GROWTH RESPONSES OF BARLEY SEEDLING TO SIMULATED WEIGHTLESSNESS INDUCED BY TWO-AXIS ROTATION.
Interim rept.,
California Univ., Los Angeles. Brain Research Inst.
Takashi Hoshizaki, W. R. Adey, and K. C. Hamner. 24 Feb 66, 15p
AFOSR-66-2197
Contract AF 49 (638)-1387, Grant NsG-538-63
Availability: Published in Planta (Berl.) v69 p218-29 1966.

Descriptors: (*Weightlessness, Plants (Botany)), Simulation, Rotation, Growth, Germination, Seeds, Cereals, Photosensitivity (Biological), Inhibition, Gravity (Artificial), Space biology.
Identifiers: Barley.

A device used for simulated weightless studies is described and is called the Nogravatron. The Nogravatron apparatus produces simulated weightlessness by rotating seedlings simultaneously at the rate of 0.25 rpm and 1.0 rpm in two axes perpendicular to each other. Atlas barley seedlings grown on the apparatus grew at rates different from that of stationary controls. Coleoptile elongation in rotated barley was not inhibited by light during the first 55 hours of rotation treatment whereas stationary controls were photoinhibited. After 55 hours the growth of rotated coleoptiles was inhibited by light. The coleoptiles did not show movements and were oriented along the longitudinal axis of the seed. Roots also did not show geotropic movements but the growth direction was affected by the proximity of other roots. Coleoptiles rotated in dark were significantly longer than stationary controls on the third and fourth day but not so on the fifth day and later. Coleoptiles rotated in light were about 35 percent longer than the stationary coleoptiles by the third day and maintained this significant difference to the end of the experiment. (Author)

AD-643 721 Not available from CFSTI.

PROBLEMS IN COSMONAUTICS PRIOR TO TAKING OFF INTO OUTER SPACE.

Foreign Technology Div., Wright-Patterson AFB, Ohio.

For primary bibliographic entry see Field 6K.

AD-643 736 HC$3.00 MF$0.65

ENHANCEMENT OF RNA SYNTHESIS, PROTEIN SYNTHESIS, AND ABSCISSION BY ETHYLENE.

Fort Detrick, Frederick, Md.

F. B. Abeles, and R. E. Holm. 13 Jun 66, 6p

Availability: Published in Plant Physiology v41 n8 p1337-42 Oct 1966.

Descriptors: (*Ribonucleic acids, Biosynthesis), (*Proteins, Biosynthesis), Antibiotics, Inhibition, Plants (Botany), Ethylenes, Aging (Physiology).

Identifiers: Abscission, Actinomycins.

Ethylene stimulated RNA and protein synthesis in bean (Phaseolus vulgaris L. var. Red Kidney) abscission zone explants prior to abscission. The effect of ethylene on RNA synthesis and abscission was blocked by actinomycin D. Carbon dioxide, which inhibits the effect of ethylene on abscission, also inhibited the influence of ethylene on protein synthesis. An aging period appears to be essential before bean explants respond to ethylene. Stimulation of protein synthesis by ethylene occurred only in receptive or senescent explants. Treatment of juvenile explants with ethylene, which has no effect on abscission also has no effect on protein synthesis. Evidence in favor of a hormonal role for ethylene during abscission is discussed. (Author)

AD-643 749 Not available from CFSTI.

METABOLIC PERIODICITY IN ADRENAL GLANDS CULTURED FROM ARCTIC RODENTS.

Technical rept.,

Arctic Inst. of North America, Washington, D. C.

R. V. Andrews, G. E. Folk, Jr., and Roger Hedge. 1965, 2p

Contract Nonr-3996 (01)

Prepared in cooperation with Creighton Univ., Omaha, Neb., and Arctic Aeromedical Lab., Fort Wainwright, Alaska.

Availability: Published in Federal Proceedings v23 1p 1965.

Descriptors: (*Arctic regions, Rodents), (*Adrenal glands, Metabolism), (*Photoperiodism, Adrenal glands), (*Rodents, Photoperiodism), Rhythm (Biology), Secretion, Steroids, Oxygen consumption, Respiration.

Circadian periodicity in isolated adrenal glands has been demonstrated for laboratory mice and for golden hamsters. Experiments were performed to test for 24-hour periodicity in adrenal glands from arctic rodents exposed to a natural 24-hour photo period, (Lemmus trimucronatus, Dicrostonyx greenlandicus, Microtus Oleowonomous, Spermophilus undulatus, and Mustela erminea arctica). These experiments employed both continuous measurement of respiratory and secretory parameters over the culture interval, and assays on glands obtained by serial (around-the-clock) sacrifice of donor animals. Oxygen consumption data indicate adrenal periodicity for all animals examined; high metabolic rates occur during the morning hours and lower rates during the evening hours. Metabolic patterns shown for contiauous culture and serial incubations are essentially the same. Combined isotope dilution and fluorometric analysis of 4-hour collections of the incubating medium shows a pattern in steroid secretion similar to, but delayed from the respiratory pattern peaks. Adrenal metabolic periodicity is maintained in arctic species in a natural continuous light environment. (Author)

AD-643 784 Not available from CFSTI.

PLASMODIUM HEGNERI N. SP. FROM THE EUROPEAN TEAL ANAS C. CRECCA IN TAIWAN.

Technical rept.,

Syracuse Univ., N. Y. Dept. of Zoology.

Reginald D. Manwell, and Robert E. Kuntz. Nov 66, 8p

NAMRU-2-TR-250, NAVMED-MF022.03.07-2003.40

Grant PHS-AI-05182-03

Availability: Published in The Journal of Protozoology v13 n3 p437-40 1966.

Descriptors: (*Plasmodium, Morphology (Biology)), Birds, Parasites, Life cycle, Taiwan.

Plasmodium hegneri n. sp. is described from the European teal duck, Anas c. crecca, from Taiwan. The blood stages, so far the only ones seen, are distinguished mainly by the elongate character of the gametocytes, which closely resemble Haemoproteus (though the pigment tends to be finer and less abundant), and the failure of both asexual and sexual forms to displace the nucleus or otherwise alter the host cell. Merozoites average 13.4 plus or minus 2.2 (range 10-19) per segmenter. Trophozoites often adhere to the host cell nucleus, and may have a large vacuole and a remarkable long, slender pseudopodium. The species so far has been seen only in the European teal, although blood films from 194 species and over 1200 birds have been examined. (Author)

AD-643 849 Not available from CFSTI.

THE NERVOUS PATHWAYS FOR POISONING, EATING AND LEARNING IN OCTOPUS.

Interim rept.,

University Coll., London (England). Dept. of Anatomy.

J. Z. Young. 25 May 65, 17p

AFOSR-66-1884

Grant AF-EOAR-42-64

Availability: Published in Journal Exp. Biol. v43 p581-93 1965.

Descriptors: (*Cephalopoda, Central nervous system), Behavior, Learning, Poisoning, Ingestion (Physiology), Memory, Great Britain.

Octopuses after removal of the lip kill and eat crabs apparently normally. They learn to attack a strange figure moving in the visual field. The pair of nerves that originates from cells at the back of the superior buccal lobe is shown to be responsible for the discharge of secretion from the posterior salivary glands. If this pair of nerves is interrupted the octopus does not poison a crab after catching it. It still eats, however, and learns to attack a strange figure. If both interbuccal connectives have been severed the octopus does not remove the flesh properly from crabs. It does not learn to attack a strange figure. Any operation on the central nervous system that interrupts the pathway from the interbuccal connectives to the lateral superior frontal and optic lobes prevents learning to attack a figure that has been seen. If such cuts pass through the middle of the superior buccal lobe the octopus does not poison crabs but may tear them open and then clean and eat them. With cuts still farther back the animal poisons, cleans and eats crab, but still does not learn to attack. (Author)

AD-643 909 Not available from CFSTI.

SPLIT-BRAIN PREPARATIONS AND TOUCH LEARNING IN THE OCTOPUS,

University Coll., London (England). Dept. of Anatomy.

M. J. Wells, and J. Z. Young. 30 Apr 65, 19p

AFOSR-66-1887

Grant AF-EOAR-42-64

Supported in part by Rockefeller Foundation.

Availability: Published in J Exptl Biol v43 p565-79 1965.

Descriptors: (*Cephalopoda, *Learning), Brain, Training, Touch, Behavior, Memory, Great Britain.

A vertical longitudinal cut through the supraoesophageal part of the brain does not prevent discrimination between rough and smooth cylinders. It does, however, prevent correct response by the opposite side after training on one side of the animal. Octopuses with intact supraoesophageal lobes, trained on one side, discriminate when tested with the same objects of the other side; split-brain animals do not. In this situation, the performance of one side of the octopus can be used as a control for the effect of a brain lesion in the other. Removal of large parts from the supraoesophageal brain does not prevent touch-learning. Discrimination continues until the lesion includes the whole of the subfrontal lobe on the side concerned. Some of the small amacrine cells of the subfrontal/posterior buccal region must remain if learning is to occur. There are normally about 2,500,000 of these in each side of the subfrontal lobe; animals continued to discriminate between rough and smooth cylinders with as few as 10,000 of these cells remaining, but failed when none were left. Octopuses with the brain intact or with the vertical lobes removed do not show marked rough/smooth preferences. In animals with large lesions to the inferior frontal system, however, there is a preference for rough, so that rough+/smooth- is an easier discrimination than vice versa. (Author)

AD-643 910 Not available from CFSTI.

THE POSITIVE AND NEGATIVE LEARNING PROCESS IN OCTOPUS VULGARIS LAMARACK. INFLUENCE OF THE VERTICAL AND MEDIAN SUPERIOR FRONTAL LOBES.

Interim rept.,

University Coll., London (England). Dept. of Anatomy.

H. Maldonado. 6 Sep 65, 21p

AFOSR-66-2006

Grant AF-EOAR-42-64

Prepared in cooperation with Buenos Aires Univ. (Argentina).

Availability: Published in Zeitschrift fur Vergleichende Physiologie v51 p185-203 1965.

Descriptors: (*Cephalopoda, Learning), Central nervous system, Brain, Behavior.

A block diagram was constructed, in order to clarify the functions of the vertical and median superior frontal lobes of the brain, for the process by which Octopus vulgaris builds up to the values of a command to attack an object in its visual field. This

model incorporates Young's idea of a balanced action of the median superior frontal-vertical lobe system and attributes precise functions to these lobes. An endeavour was made to test this hypothesis with a crucial experiment. Animals trained for some days to attack a given figure (positive) and not to attack another one (negative) underwent operative procedures to remove either the vertical or the median superior frontal lobe. According to the hypothesis animals without the vertical lobe should have a better post-operative performance with positive complexes than those without the median superior frontal lobe. The more positive the complex the greater should be the difference in the results obtained between the two groups of operated animals. With a negative figure the animals without the vertical lobe should show a poorer post-operative performance than the animals lacking the median superior frontal lobe. The experiments reported here were designed to test this hypothesis using new methods. The animals' performance both before and after operation was studied in order to compare the effects of removing the vertical or median superior frontal lobe.
AD-643 913 Not available from CFSTI.

NEURONAL LOCALIZATION OF DOPAMINE AND 5-HYDROXYTRYPTAMINE IN SOME MOLLUSCA,
Lund Univ. (Sweden). Dept. of Zoology.
Erik Dahl, Bengt Falck, Claes von Mecklenburg, Harry Myhrberg, and Evald Rosengren. 18 Nov 65, 12p
AFOSR-66-2077
Grant AF-EOAR-5-64
Availability: Published in Zeitschrift fur Zellforschung v71 p489-98 1966.

Descriptors: (*Nerve cells, Amines), (*Amines, *Mollusca), Histological techniques, Fluorescence, Nerve fibers, Serotonin, Ganglia, Morphology (Biology), Reserpine, Sweden.
Identifiers: Aminoethyl pyrocatechols.

The localization of biogenic monoamines in ganglionic tissues from Anodonta piscinalis, Helix pomatia, and Buccinum undatum was studied by means of the histochemical fluorescence method of Falck and Hillarp. In cerebral, visceral, and pedal ganglia (besides nonfluorescent nerve cells) neurons emitting a green or yellow fluorescence were found. No other cell systems exhibiting a specific fluorescence were observed. An abundance of monoaminergic terminals were found in the central parts of these ganglia. Spectrophotofluorimetric determinations showed that there are large quantities of dopamine and 5-hydroxytryptamine in the tissues investigated. The amounts of dopamine and 5-hydroxytryptamine agree well with the distribution of green and yellow fluorescence, respectively, in the ganglia. There are many similarities between the vertebrate and the molluscan monoaminergic neurons. The morphology of the neurons is the same, the intraneuronal distribution of the monoamines is identical, depletion experiments with reserpine and denervation experiments give the same results, and the synaptic arrangement of monoaminergic fibres on non-adrenergic neurons has the same appearance. Apparently, however, dopamine and 5-hydroxytryptamine are the only monoamines acting as neuronal transmitters in the species investigated. (Author)
AD-643 943 Not available from CFSTI.

BIOENERGETICS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Hsu King-hwa. 16 Sep 66, 20p FTD-TT-65-1495
TT-67-60277
Edited trans. of Ti I Tzu Ch'uan Kuo Sheng Wu Hua Hsueh Hsueh Shu Hui I Hui Kan Chinese People's Republic n1 p76-84 1962.

Descriptors: (*Biophysics, *Mass-energy relation), (*Thermodynamics, Biophysics), Molecular energy levels, Excitation, Molecular association, Motion, Information theory, China.

Contents: Possible forms of energy changes in biological bodies; Thermodynamics and the phenomenon of life; Entropy and information in biological bodies; Energy barriers and entropy barriers.
AD-643 953 HC$3.00 MF$0.65

A STUDY OF NON-VIRAL MICRO-PARASITES OF COLOMBIAN BATS.
Annual technical rept. no. 1, 1 Dec 65-30 Nov 66, Universidad de los Andes, Bogota (Colombia). Facultad de Artes y Ciencias.
Elizabeth S. Grose, and C. J. Marinkelle. 1 Nov 66, 33p
Grant DA-ARO-49-092-66-G109

Descriptors: (*Bats, Parasites), Trypanosoma, Fungi, Epidemiology, Disease vectors, Histoplasma, Coccidioides, Blood, Collecting methods, Colombia.

A considerable number of bats were collected from indicated source regions together with ground deposits of droppings in nest areas and their associated ectoparasites. Survey techniques were established. Problems of operation encountered are discussed, including sensitivity of bats to change in climate and altitude on transportation from low, tropical source to laboratories in Bogota. Organisms isolated: T.cruzi, T.rangeli; Sporotrichum schenckii, Trichophyton mentagrophytes, Microsporum canis, M.gypseum, Scopulariopsis brevicaulis, S.brumptii, S.fimicola, Cryptococcus neoformons. (Author)
AD-643 984 HC$3.00 MF$0.65

THE POSSIBILITIES OF COMMUNICATION WITH EXTRA-TERRESTRIAL CIVILIZATIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 3B.
AD-644 067 HC$3.00 MF$0.65

INFLUENCE OF PREVIOUS PREFERENCES ON THE MEMORY OF OCTOPUS VULGARIA AFTER REMOVAL OF THE VERTICAL LOBE,
University Coll., London (England). Dept. of Anatomy.
J. Z. Young. 18 Jul 65, 12p
AFOSR-66-1885
Grant AF-EOAR-42-64
Prepared in cooperation with Stazione Zoologica, Naples (Italy).
Availability: Published in Journal of Exp Biol v43 p595-603 1965.

Descriptors: (*Cephalopoda, Learning), Memory, Behavior, Response, Retention, Great Britain.

Octopuses from which the vertical lobe had been removed attacked a vertical rectangle more readily than a horizontal one when both shapes were moved vertically. During discrimination training the results differed markedly according to which figure was rewarded with food. When a vertical rectangle was positive the excess of attacks at this figure increased both within and between sessions, the animals showing considerable ability to learn. When a horizontal rectangle was the positive figure the responses to it were at first 'paradoxical', the negative shape being attacked more often. There was then improvement within each session, but little if any between the sessions. Octopuses without the vertical lobe quickly ceased to attack crabs shown at 4 min. intervals when shocks were given for attacks, and the effect could still be detected 4 hr. later. When crabs were shown at 8 min. intervals, and shocks given for attacks, there was no decline in attacks over fourteen trials. Fifteen hours later, however, some residual signs of the shocks were evident when trials were resumed at 8 min. intervals. Although all of the animals at first attacked they soon stopped doing so. After a further 15 hr. all attacked again but soon ceased to do so after receiving shocks. Normal animals, by contrast, all ceased to attack the crabs shown at 8 min. intervals after receiving four or five shocks. The memory is much more retentive in normal animals, so that 2 days after receiving shocks the octopuses seldom attacked the crabs. (Author)
AD-644 131 Not available from CFSTI.

IMMUNE RESPONSE TO A SECONDARY STIMULUS WITH LEPTOSPIRA CANICOLA AND INFECTIOUS CANINE HEPATITIS IN BEAGLES EXPOSED TO 90 SR,
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex. Dept. of Microbiology.
W. E. Clapper, A. Sanchez, and J. Levy. Jun 66, 15p
Contract AT (29-2)-1013

Descriptors: (*Infectious hepatitis, Dogs), (*Strontium, Radiation effects).

For abstract, see NSA 20 24.
LF-29 HC$3.00 MF$0.65

MISSION REQUIREMENTS FOR EXOBIOLOGICAL MEASUREMENTS ON VENUS.
Iit Research Inst., Chicago, Ill. Astro Sciences Center.
W. H. Riesen, and D. L. Roberts. Sep 66, 34p
NASA-CR-79756, P-16
Contract NASR-65/06/

Descriptors: *Extraterrestrial life, *Mission planning, *Space probe, *Venus, Atmospheric, Biological, Chemical, Compound, Earth, Entry, Environment, Exobiology, Extraterrestrial, Life, Measurement, Mission, Organic, Planning, Probe, Space.

For abstract, see STAR 05 02.
N67-12073 HC$3.00 MF$0.65

INVESTIGATION OF PEROGNATHUS AS AN EXPERIMENTAL ORGANISM FOR RESEARCH IN SPACE BIOLOGY PROGRESS REPORT, 1 JUL. - 30 SEP. 1966.
Northrop Space Labs., Hawthorne, Calif.
R. G. Lindberg. 30 Sep 66, 25p NASA-CR-80173, NSL-64-29-12
Contract NASW-812

Descriptors: *Biology, *Hypoxia, *Pocket mouse, Body, Consumption, Diet, Environment, Extreme, Hibernation, Mechanism, Mouse, Oxygen, Pocket, Regulation, Response, Temperature.

For abstract, see STAR 05 02.
N67-12209 HC$3.00 MF$0.65

INVESTIGATIONS IN SPACE-RELATED BIOLOGY, INCLUDING MOLECULAR EVOLUTION AND RELEVANT ASPECTS OF THE EXTRA-TERRESTRIAL ANNUAL REPORT, 1 JUN. 1965 - 30 SEP. 1966.
Miami Univ., Coral Gables, Fla. Inst. Of Molecular Evolution.
S. W. Fox. 30 Sep 66, 72p NASA-CR-79299, AR-2
Grant NSG-689

Descriptors: *Bioastronautics, *Evolution, *Extraterrestrial environment, Biochemistry, Chemistry, Compound, Entropy, Environment, Extraterrestrial, Instrumentation, Molecular, Organic, Physiology, Polymer, Proteinoid, Reproduction, Synthesis.

For abstract, see STAR 05 02.
N67-12225 HC$3.00 MF$0.65

6D. BIONICS

THE STATUS AND PERSPECTIVES OF DEVELOPING INVESTIGATIONS IN BIOLOGICAL CYBERNETICS AT THE ACADEMY OF SCIENCES UKR-SSR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
27 Jun 66, 7p FTD-HT-66-192
TT-65-31352
Unedited rough draft trans. of Akademiya Nauk URSR, Kiev. Dopovidi, n3 p389-90 1965.

Descriptors: (*Cybernetics, USSR), State-of-the-art reviews, Bionics, Diagnosis, Mathematical models, Cardiovascular diseases, Cerebrovascular system, Diseases, Nucleotides, Pathology, Biology.
Identifiers: Academy of Sciences of the USSR.
AD-643 705 HC$3.00 MF$0.65

NEURON MODEL,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. V. Pozin, and I. A. Lyubinskii. 9 Sep 66, 5p
FTD-HT-66-103
Unedited rough draft trans. of Patent (USSR) 171 179, appl. 901139/26-24, 20 May 64.

Descriptors: (*Nerve cells, *Bionics), Data storage systems, Input-output devices, Pulse generators, Oscillators, Patents, USSR.

There are neuron (nerve cell) models that contain input circuits, a generator node and one storage element that is common for all the stimulating inputs. These models do not consider the mutual effect of the processes in the dendrites and the soma of the neuron. In contrast to the known models, in the proposed model such interactions are considered. This is primarily attained by the fact that, instead of one common storage element, the model contains storage elements on each input. By connecting these storage elements with each other, or with the inputs, through functional elements the interaction of the inputs can be modeled, thereby obtaining a functional connection between the parameters of the input and output signals in the neuron model. (Author)
AD-643 709 HC$3.00 MF$0.65

SCIENTIFIC TECHNICAL INFORMATION (SELECTED ARTICLES).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
9 Sep 66, 41p FTD-TT-66-113
TT-67-60273
Unedited rough draft trans. of Nauchno-Tekhnicheskaya Informatsiya (USSR) n2 p34-43 1964.

Descriptors: (*Character recognition, Reading machines), (*Language, *Coding), Automatic, Equations, Selection, Interference, USSR, Information theory.
Identifiers: Words, Nouns.

Contents: Extraction of informational invariant signs during automatic reading, by V. P. Romanov; Problems of fixing names of objects, by G. S. Tabidze.
AD-643 979 HC$3.00 MF$0.65

INVESTIGATIONS OF A MODEL READER ON A COMPUTER, PART II,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 9B.
AD-644 053 HC$3.00 MF$0.65

AN ASYNCHRONOUS PULSE-AMPLITUDE PULSE-WIDTH MODEL OF THE HUMAN OPERATOR.
University Of Southern Calif., Los Angeles. Dept. Of Electrical Engineering.
M. J. Merritt. Mar 66, 42p NASA-CR-79760, USCEE-128
Contract NGR-05-018-022

Descriptors: *Human engineering, *Operator performance, *Pulse amplitude, Amplitude, Asynchronous, Computer, Discrete, Engineering, Gauss, Human, Input, Model, Operator, Output, Performance, Procedure, Pulse, Random, Width.

For abstract, see STAR 05 02.
N67-12080 HC$3.00 MF$0.65

6E. CLINICAL MEDICINE

CHANGES IN THE INTESTINES OF MONKEYS CAUSED BY NEMATODA LARVAE OESOPHAGOSTOMUM APIOSTOMUM,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 6C.
AD-643 635 HC$3.00 MF$0.65

SOME FACTORS CONTROLLING BONE RESORPTION AND FORMATION IN TISSUE CULTURE,
Harvard School of Dental Medicine, Boston, Mass.
For primary bibliographic entry see Field 6C.
AD-643 690 HC$3.00 MF$0.65

MALARIA RESEARCH PROGRAM.
Progress rept. no. 4,
Kansas City General Hospital, Mo. Harry S. Truman Medical Research Labs.
John D. Arnold, and Daniel C. Martin. 1 Sep 66, 29p
Contract DA-49-193-MD-2545

Descriptors: (*Plasmodium, Diseases), (*Antimalarials, Effectiveness), Medical research, Chemotherapeutic agents, Resistance (Biological), Drugs, Responses, Parasites.
Identifiers: Trimethoprim, Fanasil, Kelfizina, Trimeterene.

Analytical clinical summaries are presented on the following: Summary and analysis of therapeutic effect of new drugs in human volunteers with Falciparum Malaria; Summary and analysis of therapeutic effect of new drugs in human volunteers with Vivax Malaria; Potentiation by drug combination; Problems of resistance for both old and new drugs; Analysis of P. berghei infections; Studies on mechanisms of drug action; Cumulative summary of all new drug trials.
AD-643 693 HC$3.00 MF$0.65

FURTHER STUDIES OF BONE ISOGRAFTS IN DIFFUSION CHAMBERS.
Final progress rept. 1 May 59-30 Sep 66,
Harvard School of Dental Medicine, Boston, Mass.
Paul Goldhaber. 30 Sep 66, 9p
Contract DA-49-193-MD-2018
See also AD-643 690.

Descriptors: (*Bone, Implants), Immunity, Tissues (Biology), Calcification, Tissue culture, Morphology (Biology), Oxygen, X rays, Growth, Stimulation, Embryonated egg technique, In vivo analysis, Mice.

The research was developed along 2 main lines: (1) the determination of the source of new bone around subcutaneously implanted isologous or homologous bone, and (2) the determination of the factors responsible for the stimulation of new bone in tissue culture. (Author)
AD-643 695 HC$3.00 MF$0.65

SEVEN NEW HUMAN SERUM FACTORS PRESUMABLY SUPPORTED BY THE GAMMA-GLOBULINS,
California Univ., San Francisco. Medical Center.
For primary bibliographic entry see Field 6A.
AD-643 723 Not available from CFSTI.

IMMUNOLOGIC DEFICIENCY, AUTOIMMUNE DISEASE, AND LYMPHOMA: OBSERVATIONS, IMPLICATIONS, AND SPECULATIONS,
California Univ., San Francisco. Medical Center.
H. Hugh Fudenberg. 1966, 9p
Contract Nonr-2656 (12)
Presented as a Special Clinical Science Lecture at Johns Hopkins University School of Medicine, Baltimore, Md., Dec. 9, 1965.
Availability: Published in Arthritis and Rheumatism v9 n3 p464-72 Jun 1966.

Descriptors: (*Immunology, Genetics), Antigens + antibodies, Deficiency diseases, Neoplasms, Etiology, Transplantation, Gamma globulin, Lymphatic system, Anemias, Leukemia, Lymphocytes, Hematology, Tolerances (Physiology).

The association of immunologic deficiency, autoimmune disease, and malignancy of the lymphoid cells is discussed. The association of these diseases both in a given individual and in families is higher than would be anticipated on the basis of chance alone. It seems likely that immunologic deficiency predisposes to lymphomatous malignancy. Other diseases may also arise as a consequence of immunologic deficiency. Experimental data compatible with these concepts are reviewed and criticized. Work currently in progress in many laboratories should soon provide an answer to the significance of these provocative associations. (Author)
AD-643 745 Not available from CFSTI.

DETERMINATION OF INFLIGHT BIOCHEMICAL RESPONSES UTILIZING THE PAROTID FLUID COLLECTION TECHNIC,
School of Aerospace Medicine, Brooks AFB, Tex.
Bruce H. Warren, Ray W. Ware, Ira L. Shannon, and Sidney D. Leverett, Jr. Aug 66, 8p SAM-TR-66-320
Prepared for presentation at Aerospace Medical Association Annual Meeting, New York, 1965.
Availability: Published in Aerospace Medicine v37 n8 p796-9 1966.

Descriptors: (*Aviation medicine, Biochemistry), (*Saliva, Corticosteroid agents), Collecting methods, Pilots, Flight, Adrenocorticotropic hormone, Diagnosis, Diseases, Stress (Physiology).

Parotid fluid samples were collected from 11 volunteer subjects during 57 clear weather, daytime, cross-country flights in the back cockpit of NF-100F aircraft. Subjects consisted of pilots and nonpilots all of whom were in a nonpiloting capacity during the experiments. Parotid fluid samples were also collected on subjects during a normal nonflying duty day. The plastic collecting device utilized in these experiments was provided with an acrylic bite block moulded to the individual bite of each subject. This allowed easy and rapid self-positioning of the device over the parotid duct opening. All parotid fluid samples were analyzed for free 17-OHCS levels. The nonflying day mean values for free 17-OHCS levels were essentially the same for F-100 pilots and nonpilots. F-100 pilots evidenced rises of free 17-OHCS during preflight, take off, and landing portions of flight which were considerably above the nonflying day mean value as well as above the mean values of nonpilots during corresponding portions of flight. (Author)
AD-643 883 Not available from CFSTI.

INSTRUMENTED IDENTIFICATION FOR BACTERIAL DIFFERENTIATION. A. THE BAIT AND TAMIS CONCEPTS. B. IMMUNOELECTRONIC PRINCIPLES AND INSTRUMENTATION.

School of Aerospace Medicine, Brooks AFB, Tex.
For primary bibliographic entry see Field 6M.
AD-643 948 HC$3.00 MF$0.65

EFFECTS OF PSYCHOPHARMACOLOGIC DRUGS UPON SENSORY INFLOW IN NORMAL SUBJECTS, IN PSYCHIATRIC PATIENTS AND IN ANIMALS.
Universidad de la Republica, Montevideo (Uruguay). Instituto de Neurologia.
For primary bibliographic entry see Field 6O.
AD-643 985 HC$3.00 MF$0.65

ARBOVIRUS STUDIES IN SAO PAULO, BRASIL.
Annual rept. no. 1, 1 Nov 65-31 Oct 66,
Instituto Adolfo Lutz, Sao Paulo (Brazil). Laboratorio de Arbovirus.
Oscar de Souza Lopes. Nov 66, 22p
Grant DA-ARO-49-092-66-G104

Descriptors: (*Epidemiology, Brazil), (*Virus diseases, Brazil), (*Arboviruses, Epidemiology), Disease vectors, Anopheles, Serodiagnosis, Humans, Mammals, Birds, Immunity.

Three viral agents were isolated from humans in a jungle source region: (1) Boraceia - apparently recently introduced in region; (2) Tacaiuma - recently introduced; and (3) a new Group B type of long time presence. An extensive program is in progress to test wild, small animals and birds for virus. Some immune reaction was observed in animals against Junin antigen. The disease is not yet recognized in man in this area. Preliminary evidence implicates the mosquito A. (K) cruzii as a transmission vector. (Author)
AD-643 987 HC$3.00 MF$0.65

QUARTERLY PROGRESS REPORT FOR OCTOBER-NOVEMBER-DECEMBER, 1966.
Walter Reed Army Medical Center, Washington, D. C. Army Medical Biomechanical Research Lab.
Dec 64, 14p

Descriptors: (*Prosthetics, Medical research), Implants, Acrylic resins, Degradation, Adhesives, Artificial limbs, Exercise, Amputees, Joints (Physiology), Gloves, Transplantation, Hands, Deafness, Earphones, Hooks, Polymers, Laminates.
Identifiers: Polycyanoacrylates.
AD-644 025 HC$3.00 MF$0.65

THE DEGREE OF COUPLING AND THE IMMUNOGENICITY OF p-AZOBENZENEARSONATE CONJUGATES OF POLY-L-TYROSINE.
Weizmann Inst. of Science, Rehovoth (Israel). Section of Chemical Immunology.
For primary bibliographic entry see Field 6A.
AD-644 060 Not available from CFSTI.

AN IMPROVED METHOD FOR THE PREPARATION OF FECES FOR BOMB CALORIMETRY.
Rept. for Dec 64-Mar 65,
School of Aerospace Medicine, Brooks AFB, Tex.
Hubert G. Lovelady, and Emmett J. Stork. Nov 66, 9p SAM-TR-66-98

Descriptors: (*Calorimetry, Test methods), Excretion, Freeze drying, Moisture, Removal, Odors.
Identifiers: Feces.

A freeze-drying method has been developed by which human feces can be prepared for the determination of total calories by bomb calorimetry. Weighed, homogenized fecal slurries are prefrozen and lyophilized to dryness by means of a freeze-drying apparatus. Advantages of this method over the vacuum oven - drying method include: (1) removal of a greater percentage of moisture content from the sample initially, (2) total time required for drying of the sample reduced from 48 hours to 16 hours, (3) no need for grinding since the freeze-dried sample is in the powdered form, and (4) absence of objectionable odors during processing of the samples. (Author)
AD-644 157 HC$3.00 MF$0.65

A COLLABORATIVE RESEARCH STUDY IN TRANSPLANTATION IMMUNOLOGY.
Annual contract progress rept. 25 Jun 65-30 Sep 66,
Turin Univ. (Italy). Istituto di Genetica Medica.
Ruggero Ceppellini. 30 Sep 66, 38p
Contract PH 43-65-655

Descriptors: (*Transplantation, Immunology), (*Leukocytes, Antigens + antibodies), Immune serums, Cytology, Toxicity, Immunity, Females, Test methods, Blood platelets, Skin, Italy.

High-titred cytotoxic antisera can be easily induced in human recipients with a variety of immunization schedules. 8 liters of potent cytotoxic sera were obtained. Although not yet completely analyzed they detect the majority of already known antigenic specificities, and some new ones. At the present moment, Terasaki's cytotoxicity micromethod seems to be the best typing technique. However, new approaches have been found and automatization of typing can be foreseen. The analysis of the specificity of the sera remains a major problem, which can be solved with the concurrent help of: (a) computer analysis; (b) serological absorption; (c) family study. (Author)
PB-173 613 HC$3.00 MF$0.65

6F. ENVIRONMENTAL BIOLOGY

PHOTOSYNTHETIC HALOPHILES FROM OWENS VALLEY FINAL REPORT.
Space-general Corp., El Monte, Calif.
31 Aug 66, 37p NASA-CR-80104, SGC-917FR-1
Contract NASW-1294

Descriptors: *Bacteria, *Photosynthesis, Anaerobe, Biology, Brine, Crystal, Deposit, Evaporation, Growth, Halogen, Halophile, Lake, Water.

For abstract, see STAR 05 02.
N67-12255 HC$3.00 MF$0.65

6H. FOOD

RAPID DECOMPRESSION AND EXPOSURE OF FRESH FOODS TO NEAR VACUUM CONDITIONS,
School of Aerospace Medicine, Brooks AFB, Tex.
Julian P. Cooke, and Norman D. Heidelbaugh. Aug 66, 7p SAM-TR-65-321
Availability: Published in Aerospace Medicine v37 n8 p788-90 Aug 1966.

Descriptors: (*Food, Decompression), Vacuum, Fruits, Vegetables, Eggs, Nutrition, Space flight.

Representative samples of 8 different unpackaged fresh foods (apples, bananas, carrots, eggs, grapes, oranges, plums, tomatoes) were decompressed in 1 second from 259 mm. Hg to 1 mm. Hg absolute pressure and then held at about 1 mm Hg absolute for 30 minutes. Food samples with internal temperatures at the start of decompression of 24C., 37C., and 55C. were observed. The only significant differences detected in these decompressed foods when compared to nondecompressed controls occurred in the 55C. bananas, plums, and tomatoes which exploded. The pressure differential experienced by these foods was calculated by measuring the vapor pressure of their juices. These observations should be of value in understanding the reactions of foods exposed to rapid decompression and also to the selection of foods for use in altitude chambers and spacecraft. (Author)
AD-643 889 Not available from CFSTI.

6K. LIFE SUPPORT

PROBLEMS IN COSMONAUTICS PRIOR TO TAKING OFF INTO OUTER SPACE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. Mironova. 24 Aug 66, 9p FTD-HT-66-123 TT-67-60261
Unedited rough draft trans. from Pravda, Leningrad (USSR) 18 Aug p3 1963.

Descriptors: (*Closed ecological systems, Space flight), Space biology, Life support, Food, Oxygen, Water, Algae, Fishes, Chickens, USSR.
AD-643 736 HC$3.00 MF$0.65

DESIGNING A REGENERATIVE CO2 REMOVAL SYSTEM FOR MANNED SPACECRAFT,
Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 22B.
AD-643 796 Not available from CFSTI.

LIFE SUPPORT SYSTEM FOR SPACE FLIGHTS OF EXTENDED TIME PERIODS.
General Dynamics Corp., San Diego, Calif.
R. C. Armstrong. Nov 66, 587p NASA-CR-614
Contract NAS1-2934

Descriptors: *Life support system, *Manned space flight, *Space cabin simulation, Atmosphere, Cabin, Carbon dioxide, Chemical, Factor, Food, Human, Life, Manned, Method, Oxygen, Physical, Prototype, Simulation, Space, Space flight, Support, System, Test, Waste, Water.

For abstract, see STAR 05 02.
N67-11342 HC$3.00 MF$0.65

ELECTROLYSIS CELL FOR ORBITAL TEST.
Trw, Inc., Cleveland, Ohio.
D. L. De Respiris, J. G. De Steese, C. W. Fetheroff, R. G. Huebscher, and G. L. Mrava. Nov 66, 68p NASA-CR-648
Contract NASW-998

Descriptors: *Electrolysis, *Spacecraft environment, *Water, Carbon dioxide, Cell, Compactness, Control, Design, Electrode, Environment, Fabrication, High purity, Instrumentation, Lightweight, Orbit, Oxygen, Regeneration, Spacecraft, Subsystem, Supply, Test.

For abstract, see STAR 05 02.
N67-11822 HC$3.00 MF$0.65

6L. MEDICAL AND HOSPITAL EQUIPMENT

A QUANTITATIVE IMPEDANCE PNEUMOGRAPH,
Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
George E. Bergey, William C. Sipple, William A. Hamilton, and Russell D. Squires. 10 Nov 66, 32p NADC-MR-6622

Descriptors: (*Respiration, Monitors), (*Medical equipment, Telemeter systems), Lungs, Volume, Electrical impedance, Thorax, Measurement, Electrodes, Skin, Polyethylene plastics.
Identifiers: Pneumographs, Biotelemetry.

The report describes an impedance pneumograph capable of measuring quantitatively respiratory volumes. Features of this system include the use

of a higher frequency (300 KHz) excitation voltage than is normally used in impedance pneumography and the use of pasteless electrodes which are insulated from the subject by a layer of polyethylene, thus forming a capacitive coupling of the electrodes to the subject and eliminating the problems associated with skin-to-electrode impedance changes. A near perfect empiric correlation was found to exist between the transthoracic impedance measured by this device and pulmonary volume. (Author)
AD-643 687 HC$3.00 MF$0.65

A TORQUE MOTOR SERVOROTATOR FOR VESTIBULAR APPLICATION.
Joint rept.,
Naval Aerospace Medical Inst., Pensacola, Fla.
W. Carroll Hixson, and Jorma I. Niven. Sep 66, 20p NAMI-979
NAVMED-MR005.04-0021.137
Report prepared jointly with NASA, NASA-Order-R-93.

Descriptors: (*Vestibular apparatus, Acceleration tolerance), (*Acceleration tolerance, Test equipment), Servomechanisms, Servomotors, Acceleration, Nystagmus, Rotation, Responses, Space medicine.

The Periodic Angular Rotator is a novel servorotator designed for studies of the dynamic response of the oculovestibular system. It will rotate a single subject about an Earth-vertical axis in a wide variety of stimulus waveforms. Step function, ramp, and sinusoidal angular motions are generated precisely by a closed-loop power servomechanism drive system. The use of a low speed DC torque motor coupled directly to the payload resulted in a system with low acoustic noise and mechanical vibration properties, fast dynamic response characteristics, and a high degree of coupling stiffness. When operated in a velocity mode of control, the device is rated to produce a maximum angular velocity of 100 rpm either clockwise or counterclockwise at angular accelerations up to 100 deg/sq sec and sinusoidal oscillation frequencies beyond 2.0 cps. When operated in the alternative displacement mode, similar ratings apply over a plus or minus 150 degree excursion. (Author)
AD-644 003 HC$3.00 MF$0.65

A METHOD OF MEASURING THE EFFECT OF DRUGS ON SWEATING AS A FUNCTION OF TIME,
Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
For primary bibliographic entry see Field 6O.
AD-644 137 Not available from CFSTI.

A SELF-BALANCING SCALE FOR WEIGHING HUMAN SUBJECTS,
Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
Arthur C. Custance. 14 Mar 66, 3p DCBRL-498
Availability: Published in Journal of Applied Physiology v21 n5 p1675-6 Sep 1966.

Descriptors: (*Balances, Accuracy), (*Body weight, Balances), Exercise, Perspiration, Measurement, Water.

A method for the elimination of judgment in determining human weight losses is described. A mercury switch, mounted on the scale beam, is used to adjust the content of a counterweight in the form of a water reservoir through a solenoid valve. The difference in volume of water in the before and after exercise situations is a measure of the subject's water loss. (Author)
AD-644 154 Not available from CFSTI.

REVIEW OF SOME APPLICATIONS OF OAK RIDGE CENTRIFUGES TO THE VACCINE DEVELOPMENT PROGRAM,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
For primary bibliographic entry see Field 6M.
PB-173 690 HC$3.00 MF$0.65

6M. MICROBIOLOGY

DETECTION AND IDENTIFICATION OF BACTERIA BY GAS CHROMATOGRAPHY.
Interim rept.,
General Electric Co., Syracuse, N. Y. Electronics Lab.
Y. Henis, J. R. Gould, and M. Alexander. 13 Jan 66, 14p
AFOSR-66-2208
Contract AF 49 (638)-1418
Prepared in cooperation with Cornell Univ., Ithaca, N. Y.
Availability: Published in Applied Microbiology v14 n4 p513-24 Jul 1966.

Descriptors: (*Bacteria, Gas chromatography), Identification, Bacillus, Escherichia coli, Aerobacter aerogenes, Pseudomonas aeroginosa, Electron capture, Bacterial extracts, Spectrum signatures, Fatty acids, Propionic acid, Acetic acids, Alcohols, Acetones, Glycols.
Identifiers: Butanediols, Acetoin, Butanediones.

Ether extracts of cultures of 29 strains representing 6 species of Bacillus, and of individual strains of Escherichia coli, Aerobacter aerogenes, and Pseudomonas aeruginosa were examined in a gas chromatograph by use of flame ionization and electron capture detectors. Among the products detected were compounds with the chromatographic characteristics of acetic, propionic, and butyic acids, ethyl alcohol, diacetyl, acetoin, and 2,3-butanediol. The differences in peak areas of the various products formed by the bacteria were determined statistically for the chromatograms obtained with the two detectors, and the peaks were arranged in order of decreasing areas to yield a signature for each bacterial strain. Different signatures were obtained for the various genera and species and for strains of the same species. B. licheniformis, B. subtilis, and A. aerogenes formed significant quantities of a number of volatile compounds, and qualitative and quantitative differences between strains were noted. The electron capture detector was particularly sensitive to diacetyl and acetoins as well as to unknown compounds. By use of this detector, the presence of 5 pg. of diacetyl and 20 pg of acetoin could be demonstrated. The quantity of acetoin detected in B. subtilis and B. licheniformis cultures was present in as little as .0063 microliters of medium. (Author)
AD-643 653 Not available from CFSTI.

METABOLISM OF BIOTIN AND ANALOGUES OF BIOTIN BY MICROORGANISMS. II. FURTHER STUDIES ON THE CONVERSION OF D-BIOTIN TO BIOTIN VITAMERS BY LACTOBACCILLUS PLANTARUM,
Cincinnati Univ., Ohio. Dept. of Microbiology.
Jerome Birnbaum, and Herman C. Lichstein. 18 May 66, 8p
Grant NSF-GB-2595
Availability: Published in Journal of Bacteriology v92 n4 p913-9 Oct 1966.

Descriptors: (*Vitamin B complex, *Lactobacillus), Growth, Culture media, Enzymes, Degradation, Electrophoresis, Chromatographic analysis, Biosynthesis, Metabolism.

Lactobacillus plantarum growing in excess biotin converts a portion to two vitamers (combinable and uncombinable with avidin) not utilizable for growth. These were detected by differential yeast-lactobacillus assay. In the present study, suspensions of 12- and 72-hr cells showed no converting activity. Vitamer formation by nonproliferating 24-hr cells required glucose and exhibited a lag; 17-hr cells showed neither a lag nor a glucose requirement. Iodoacetate and chloramphenicol inhibited vitamer formation by 24-hr cells, but had no effect on 17-hr cells. Addition of hydrolyzed casein or preincubation in biotin decreased the lag and enhanced vitamer formation in 24-hr cells, but had no effect in 17-hr cells. Apparently, 17-hr cells contain the converting enzymes which degenerate as growth proceeds; the lag exhibited by 24-hr cells represents the time necessary to reform the enzymes. Equal amounts of the two vitamers were formed in 17-hr cells; only the avidin-combinable form was produced initially by 24-hr cells, unless hydrolyzed casein was present. Electrophoresis revealed that the avidin-combinable vitamer has the same charge as biotin, whereas the uncombinable form possesses both positive and negative groups. Column chromatography was used to separate the avidin uncombinable material from biotin and the avidin-combinable form. L. plantarum was unable to accumulate the avidin-uncombinable vitamer under conditions permitting good biotin accumulation. It was concluded that L. plantarum sequentially converts biotin to avidin-combinable and -uncombinable vitamers, the latter being impermeable to the cells. (Author)
AD-643 673 Not available from CFSTI.

PERIODATE INHIBITION OF TRANSFORMATION AND COMPETENCE DEVELOPMENT IN HAEMOPHILUS INFLUENZAE.
Cincinnati Univ., Ohio. Dept. of Microbiology.
Jon M. Ranhand, and Herman C. Lichstein. 3 Jun 66, 5p
Grants NSF-GB-2595, PHS-5T1-GM-1255
Availability: Published in Journal of Bacteriology v92 n4 p956-9 Oct 1966.

Descriptors: (*Brucellaceae, Iodates), Inhibition, Transformations, Streptomycins, Resistance (Biological), Viability, Desoxyribonucleic acids.

Periodate treatment of competent cells reduced the frequency of transformation to streptomycin resistance about 90% while reducing cell viability about 30% or less. Moreover, when periodate was added to cells early in the competence-development phase, these, too, were unable to develop maximal competence. Periodate inhibition was dependent on time and concentration as well as on the composition of the suspending menstruum. Periodate had no effect on transforming deoxyribonucleic acid (DNA), nor did it prevent transformation when added to competent cells which had already reacted with DNA. Furthermore, the progeny from cells inactivated 90% could be made fully competent, showing that the inhibition was not genetic. It was concluded that the periodate-sensitive substrate may involve the DNA binding site (s). (Author)
AD-643 674 Not available from CFSTI.

APPARENT GENOMIC MAPPING OF STAPHYLOCOCUS AUREUS BY A NEW METHOD.
Fort Detrick, Frederick, Md.
Robert A. Altenbern. 17 Oct 66, 8p
Availability: Published in Biochemical and Bophysical Research Communications v25 n3 8p 1966.

Descriptors: (*Staphylococcus aureus, *Genetics), Chromosomes, Mutations, Desoxyribonucleic acids, Vitamin B complex, Guanine, Nitroso compounds.
Identifiers: Genetic mapping.

The data in this communication indicate that the chromosome of Staphylococcus aureus can be mapped by enumerating mutants induced by exposure to nitrosoguanidine at various times during synchronous DNA replication. Theoretically this method should be applicable to any bacterium in which chromosomal duplication can be synchronized. (Author)
AD-643 748 Not available from CFSTI.

Group 6M—Microbiology

METABOLISM OF BIOTIN AND ANALOGUES OF BIOTIN BY MICROORGANISMS. III. DEGRADATION OF OXYBIOTIN AND DESTHIOBIOTIN BY LACTOBACILLUS PLANTARUM,
Cincinnati Univ., Ohio. Dept. of Microbiology.
Jerome Birnbaum, and Herman C. Lichstein. 18 May 66, 6p
Contract Nonr-3609 (00), Grant NSF-GB-2595
See also AD-643 810.
Availability: Published in Journal of Bacteriology v92 n4 p920-24 Oct 1966.

Descriptors: (*Lactobacillus, Vitamin B complex), (*Vitamin B complex, Degradation), Saccharomyces, Growth, pH, Culture media, Enzymes.

Lactobacillus plantarum growing in excess oxybiotin degraded a portion to products not utilizable by Saccharomyces cerevisiae. The loss of activity for the yeast suggested that no vitamers of oxybiotin accumulated during the degradation. The initiation of degrading activity was controlled by the pH of the growth medium and appeared during early stationary phase. Only cells grown in excess oxybiotin could degrade this biotin analogue. Nonproliferating cells grown previously in excess oxybiotin were able to convert biotin to vitamers (active for the yeast) as well as to degrade oxybiotin. Those grown in excess biotin also developed the ability to degrade oxybiotin as well as to convert biotin; however, in this case, the enzymes degenerated more rapidly. Cells grown with excessive amounts of either material were able to degrade desthiobiotin to products not available for the yeast. Both biotin conversion and oxybiotin degradation were found to have the same requirements of Mg and Mn ions. It was concluded that conversion of biotin to vitamers, and the degradation of oxybiotin or desthiobiotin are functions of the same or closely related enzyme systems. (Author)
AD-643 809 Not available from CFSTI.

METABOLISM OF BIOTIN AND ANALOGUES OF BIOTIN BY MICROORGANISMS. IV. DEGRADATION OF BIOTIN, OXYBIOTIN, AND DESTHIOBIOTIN BY LACTOBACILLUS CASEI,
Cincinnati Univ., Ohio. Dept. of Microbiology.
Jerome Birnbaum, and Herman C. Lichstein. 18 May 66, 7p
Contract Nonr-3609 (00), Grant NSF-GB-2595
See also AD-643 809.
Availability: Published in Journal of Bacteriology v92 n4 p925-30 Oct 1966.

Descriptors: (*Lactobacillus, Vitamin B complex), (*Vitamin B complex, Degradation), Growth, Saccharomyces, pH, Culture media, Inhibition, Metabolism, Antimetabolites.

Lactobacillus casei degrades biotin when it is present in excess to products not utilizable for growth by L. plantarum or Saccharomyces cerevisiae. Degrading activity was initiated in the early stationary phase and was controlled by the pH of the medium. Nonproliferating cells, grown previously in excess biotin for 40 hr, metabolized oxybiotin and desthiobiotin as well as biotin. Cells grown in low biotin, or in excess biotin for 20 hr, did not degrade either analogue. Oxybiotin was 50% as active as biotin for growth, whereas desthiobiotin acted as a competitive inhibitor. Cells grown in excess biotin for 40 hr, but not 20 hr, overcame the inhibitory effect of desthiobiotin, when subcultured to media containing a normally inhibitory concentration of the analogue. Moreover, the level of desthiobiotin dropped rapidly during the first 4 to 6 hr before growth ensued. The data indicate that growth in excess biotin enables L. casei to degrade desthiobiotin and, thereby, to overcome the inhibitory effect of the analogue. (Author)
AD-643 810 Not available from CFSTI.

RECOVERY OF CLOSTRIDIA FROM HUMAN FECES. DEVELOPMENT OF A METHOD.
Rept. for Jan 65-Jan 66,
School of Aerospace Medicine, Brooks AFB, Tex.
Charles Eller. Sep 66, 14p SAM-TR-66-81

Descriptors: (*Clostridium, Intestines), Humans, Diet, Recovery, Morphology (Biology), Excretion, Clostridium perfringens, Culture media, Spores.
Identifiers: Feces, Anaerobes.

A method allowing consistent recovery of clostridia from human feces is presented. During development of this procedure, clostridia were isolated in 105 of 161 specimens. Maximal dilution at which isolations were obtained varied from .001 to 10 to the minus 9th power, with a median of .00001. Diet was without effect. The final procedure employed heated dilutions of .01, .001, and .0001 with blood agar and sulfite-polymyxin-sulfadiazine (SPS) agar. Unheated dilutions were .00001, .000001, and 10 to the minus 7th power with blood agar and .0001, .00001, and .000001 with SPS agar. Clostridia were isolated from 20 to 21 samples. On the basis of morphology, 312 clostridial isolates were divided into seven groups. The most frequent type consisted of slender rods with terminal spores. By streaking heated suspensions to blood agar, C. perfringens was recovered from 20 of the 161 samples. Media used by others are discussed, and the usual fecal clostridia are listed. (Author)
AD-643 819 HC$3.00 MF$0.65

INCORPORATION OF C1 UNITS INTO ALLULOSE PHOSPHATE BY METHANE-GROWN PSEUDOMONAS METHANICA,
Sheffield Univ. (England). Dept. of Biochemistry.
For primary bibliographic entry see Field 6A.
AD-643 915 Not available from CFSTI.

INSTRUMENTED IDENTIFICATION FOR BACTERIAL DIFFERENTIATION. A. THE BAIT AND TAMIS CONCEPTS. B. IMMUNOELECTRONIC PRINCIPLES AND INSTRUMENTATION.
Rept. for 1963-1966,
School of Aerospace Medicine, Brooks AFB, Tex.
Irving Davis, William G. Glenn, Warren J. Russell, Wesley E. Prather, and Heinz A. Jaeger. Nov 66, 18p SAM-TR-66-61

Descriptors: (*Bacteria, Identification), (*Bacterial extracts, *Antigen-antibody reactions), Instrumentation, Automation, Telemeter systems, Antigens + antibodies, Immunology, Densitometers.
Identifiers: BAIT, TAMIS.

The BAIT (Bacterial Automated Identification Technic) concept for identification of bacteria, appropriate for small area-point source coverage, is outlined. Coupling of the BAIT instrument with other medical defense requirements is described. Finally, a concept for large area coverage for biologic agent identification is presented. This is the TAMIS (Telemetric Automated Microbial Identification System) concept. The differentiation of bacterial extracts by precipitin analyses has been well established by the researches of numerous investigators. Advances in instrumentation have made the quantitation of this type of antigen-antibody reaction both exacting and efficient. This report emphasizes principles of quantitation, methods, and instruments currently in use for electronic data reduction and evaluation of the comparability of precipitin reactions. (Author)
AD-643 948 HC$3.00 MF$0.65

A HIGH TITERED HEMAGGLUTININ IN TISSUE CULTURE PREPARED FROM JAPANESE B ENCEPHALITIS VIRUS,
Pittsburgh Univ., Pa. Dept. of Epidemiology and Microbiology.
Medhat A. Darwish, and William McD. Hammon. 21 Mar 66, 3p
Contract DA-49-193-MD-2042
Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v122 p809-13 1966.

Descriptors: (*Agglutinins, Tissue culture), (*Japanese B encephalitis virus, Agglutinins), (*Tissue culture, Japanese B encephalitis virus), Culture media, Volumetric analysis, Stability, Sources.

Hemagglutinins (HA) of JBE virus prepared from infected Hamster kidney cell (HKC) cultures were masked by serum, an essential ingredient of good nutrient medium. By removing the serum containing medium at the first sign of Cytopathic effect (CPE) and substituting a serum-free medium 199 at pH 8.0, until harvesting 16 hours later, a high titered HA was obtained. Reducing the amount of culture medium resulted in a further proportional increase in hemagglutinins and an HA titer of at least 1:1024 was easily obtained. Factors such as adaptation of the virus strain to tissue culture, multiplicity of infection as respects the inoculum, and delayed harvest did not seem to play any important role in HA titer. However, the presence of a stabilizer (H.Al.) in the serum-free medium may have a minor effect on HA titer at pH 7.0. A direct relationship was usually found between the infectious and HA titers in a freshly harvested serum-free medium. Stability of hemagglutinin was demonstrated for at least 8 days at 30 and 37C in medium 199 containing 2% H.Al. at pH 7.8 though the infectivity titer decreased rapidly. At 5C the HA titer was preserved without detectable decrease for at least 18 months and such stability was not dependent on the pH of the harvest or the presence of any added stabilizer in the medium. Such HA was noninfectious. The simple technique employed to achieve high-titered hemagglutinin from tissue culture and its stability together with loss of infectivity at refrigerator temperature offer a valuable substitute for the suckling mouse brain antigen for this, and at least some other group B arboviruses and probably others. (Author)
AD-644 032 Not available from CFSTI.

ELECTRON-MICROSCOPE INVESTIGATION OF BACTERIA AND PHAGES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. P. Pekhov. 13 Jun 66, 302p FTD-TT-65-1922/TT-67-60330
Unedited rough draft trans. of mono. Elektronnomikroskopiches
koe Issledovanie Bakterii i Fagov (Submicroskopicheskaya Anatomiya), Moscow, 1962 224p.

Descriptors: (*Bacteriophages, Electron microscopy), Bacteria, Electron microscopes, Preparation, Visual inspection, Cell structure, Morphology (Biology), Biochemistry, Biophysics, USSR.

The monograph gives a practical course in electron microscopy and presents the modern achievements of the submicroscopic techniques of studying bacteria and phages. Methods of electron microscopic analysis of bacteria and phages, techniques of preparing ultrathin bacterial and phage sections, as well as data on the ultrastructure of bacteria and phages and on the development of phages within the bacteria, are presented in detail.
AD-644 142 HC$3.00 MF$0.65

EXPOSURE OF TRADESCANTIA MICROSPORES TO PERIODIC VIBRATIONS OF 40-100 HERTZ.
Naval School Of Aviation Medicine, Pensacola, Fla. Naval Aerospace Medical Inst.
L. J. Bales, and J. C. Knepton, Jr.. Oct 66, 19p
NASA-CR-79510, NAMI-981
NASA ORDER R-10-009-027

Descriptors: *Chromosome, *Tradescantia, *Vibration effect, Cytology, Effect, Exposure, Fragment, Growth, Impairment, Microspore, Periodic, Spherical, Vibration.

For abstract, see STAR 05 02.
N67-11740 HC$3.00 MF$0.65

THE SURVIVAL OF MICROORGANISMS IN SPACE. FURTHER ROCKET AND BALLOON BORNE EXPOSURE EXPERIMENTS.
Dudley Observatory, Albany, N. Y.
C. Hemenway, J. Hotchin, P. Lorenz, and A. Markusen. 1966, 7p NASA-CR-79911
Grant NSG-155
Presented At The Cospar Meeting, Vienna, May 1966

Descriptors: *Microorganism, *Space environment, *Survival, Balloon, Experiment, Exposure, Radiation, Rocket, Solar, Spore, Terrestrial, Virus.

For abstract, see STAR 05 02.
N67-11844 HC$3.00 MF$0.65

EFFECTS OF HIGH AND LOW BAROMETRIC PRESSURES ON SUSCEPTIBILITY AND RESISTANCE TO INFECTION QUARTERLY STATUS REPORT, 1 JUL. - 30 SEP. 1966.
Naval Medical Research Inst., Bethesda, Md. Dept. Of Microbiology.
F. B. Gordon. 30 Sep 66, 17p NASA-CR-80119, SC-R-21-010-010
NASA ORDER R-21-010-010

Descriptors: *Bacteria, *Infection, *Mouse, *Pressure distribution, Animal, Barometer, Chamber, Distribution, Effect, Environment, Experiment, Gas, Klebsiella, Pressure, Resistance, Study, Susceptibility.

For abstract, see STAR 05 02.
N67-12250 HC$3.00 MF$0.65

REVIEW OF SOME APPLICATIONS OF OAK RIDGE CENTRIFUGES TO THE VACCINE DEVELOPMENT PROGRAM,
National Inst. of Allergy and Infectious Diseases, Bethesda, Md.
D. A. Fuccillo, Jr. 1966, 9p

Descriptors: (*Vaccines, Preparation), Centrifuges, Pathology, Viruses, Centrifuge separation, Laboratory equipment.

Equipment and techniques developed at Oak Ridge National Laboratory have demonstrated their usefulness in virus isolation, and are potentially applicable to large-scale production of vaccine. The preparation of vaccines that contain only virus particles, or viral subunits, was one of the two urgent fractionation problems that stimulated zonal centrifuge development. The other one was the search for trace amounts of virus in pathological samples. Over 40 rotor systems and rotor modifications have been constructed. These are grouped into classes based on speed ranges and uses. (Author)
PB-173 690 HC$3.00 MF$0.65

FEASIBILITY STUDY: PARAINFLUENZA VIRUS ISOLATED ANTIGEN VACCINE.
Semi-annual contract progress rept., 1 Mar-1 Sep 66,
Parke, Davis and Co., Detroit, Mich.
Frank B. Brandon. 1 Sep 66, 52p
Contract PH-43-66-37

Descriptors: (*Parainfluenza virus, *Vaccines), Antigens + antibodies, Agglutinins, Preparation, Immunity, Growth, Stability, Electron microscopy, Laboratory animals, Tissue culture, Feasibility studies.

Master seeds for parainfluenza types 1, 2 and 3 were prepared. The seed for types 1 and 2 completed all appropriate tests for safety and purity. The seed for type 3 virus is on test. It is assumed that the hemagglutinating activity of preparations containing intact virus is proportional to the virus concentration and hence to animal immunogenicity. Thus, hemagglutinating activity was used to monitor growth, concentration and stability studies of intact virus preparations. A standard procedure was developed (including multiple harvests) for the growth of parainfluenza type 1 virus, and a number of lots of crude virus prepared. Sharples centrifugation appears to be a satisfactory procedure for routine concentration of the virus. Concentrated virus was used for extraction and stability studies. Physical and biological characterization of the intact virus and the isolated antigen was started, including a preliminary rate zonal run in the B-IV rotor which suggests pleomorphism of the intact virus. Several mild extraction procedures reproducibly increase the hemagglutination titer, although the antigens so derived are not identical. Two major problems are (1) the relative instability of intact virus and ether-isolated hemagglutinins and (2) the continuing lack of a suitable common laboratory animal for conducting routine screening tests. (Author)
PB-173 691 HC$3.00 MF$0.65

6N. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

THE PREDICTION OF FOUR-YEAR MILITARY EFFECTIVENESS FROM CHARACTERISTICS OF NAVAL RECRUITS,
Navy Medical Neuropsychiatric Research Unit, San Diego, Calif.
John A. Plag, and Jerry M. Goffman. Aug 66, 10p
Rept. no. 66-8
NAVMED-MF022.01.04-9001
Availability: Published in Military Medicine v131 n8 p729-35 Aug 1966.

Descriptors: (*Naval personnel, Selection), (*Military psychology, Naval personnel), Effectiveness, Performance (Human), Recruiting, Statistical analysis, Probability, Predictions, Decision making, Psychiatry, Psychometrics.

The purpose of this study was to examine the relation of background characteristics of naval recruits to a four-year criterion of military effectiveness. Sailors classified as rendering effective performances were those completing their periods of active obligated service and being recommended for reenlistment. Linear multiple regression procedures were employed for the purpose of deriving an equation in which statistically significant predictors would receive optimal weights and yield a predicted score indicative of a subject's probability of naval effectiveness. Such probability estimates, it was reasoned, could be of value to psychiatrists who regularly make decisions to retain or discharge recruits from service. For the experimental samples, totaling 3,630 sailors, it was found that approximately 73 per cent rendered effective service. A combination of five recruit characteristics was found to give the best prediction of the four-year criterion ($r = .38$). These were level of schooling, family stability, number of expulsions from school, Arithmetic Test score, and Mechanical Test score. Data analyses indicated the derived composite multiple prediction of effectiveness to be far more valid than clinicians' judgments at the time of the initial recruit training screening interview. Suggested uses of computed effectiveness probabilities in the Navy's preventive psychiatry program at recruit training commands were discussed. (Author)
AD-644 138 Not available from CFSTI.

GEOGRAPHIC AND ASTRONOMIC DISTANCE RESPONSES BY RATED OFFICERS,
Aeromedical Reviews,
School of Aerospace Medicine, Brooks AFB, Tex.
Bernard I. Grosser. Oct 66, 8p Review-5-66

Descriptors: (*Psychiatry, Astronauts), (*Astronauts, Selection), (*Mental disorders, Diagnosis), (*Aviation personnel, Psychometrics), Intelligence tests, Motivation, Anxiety, Performance (Human).

The data demonstrate that knowledge of distance around the earth, distance to the moon, and distance to the sun cannot be used as a test for organic brain damage in rated pilots and navigators. The diagnosis of organicity based on fund-of-information deficit is predicated on the principle that a given population normally has knowledge of the facts which are employed in the examination. The most nearly perfect answer was in response to the question of distance around the earth; however, the fact that more than 1 in 10 rated officers gave an incorrect response precludes the use of this question as a test for organic deficit. (Author)
AD-644 155 HC$3.00 MF$0.65

6O. PHARMACOLOGY

HOSPITAL PHARMACY AND AUTOMATION,
System Development Corp., Santa Monica, Calif.
Morton Slavin. 10 Jan 63, 11p SP-1041
Presented at the Annual Hospital Pharmacy Seminar (15th), Tex Univ., Austin, Mar 22-24, 1963.
NSF Scientific Documentation Project.

Descriptors: (*Data processing systems, *Pharmacology), (*Hospitals, Data processing systems), Automation.

While hospital pharmacy and automation may appear to be strange bedfellows, in these days of rapid technological advance, automation has had an impact on every conceivable type of industry and profession. Automated instruction has been suggested as an adjunct to the teaching of pharmaceutical subjects, and automated data processing has been applied to the handling of pharmacy business and inventory control data, and inventory control data, and to the compilation of drug listings and formularies. These pharmaceutical applications of automation are just the beginning, and many others will inevitably follow. This may dismay some pharmacists, but they must face up to these changes just as they have in the past to so many others which, although they altered the profession, changed it for the better.
AD-296 330 HC$3.00

SPORIDESMINS. PART IV. ISOLATION AND STRUCTURE OF DEHYDROGLIOTOXIN A METABOLITE PENICILLIUM TERLIKOWSKII,
National Research Council of Canada, Halifax (Nova Scotia). Atlantic Regional Lab.
For primary bibliographic entry see Field 7C.
AD-643 568 Not available from CFSTI.

REVERSAL OF DECARBORANE-MEDIATED NOREPINEPHRINE DEPLETION BY METHYLENE BLUE,
School of Aerospace Medicine, Brooks ABF, Tex.
James H. Merritt, and John A. Merritt. Aug 66, 6p SAM-TR-65-217
Availability: Published in Aerospace Medicine v37 p786-7 1966.

Descriptors: (*Decaboranes, Detoxification), (*Levarterenol, Tissues (Biology)), (*Methylene blue, Pharmacology), Brain, Heart, Parenteral infusions, Therapy.

Decaborane (B10H14) was found to deplete rabbit brain-stem and heart tissue of norepinephrine content. Six hours after 15 mg. of decarborane/kg., the norepinephrine content was 33 per cent and 57 per cent of control values for brain and heart, respectively. Administration of methylene blue in a continuous drip over a 6-hour period (an initial dose of 7 mg./kg. in 5 per cent glucose, and then 0.13 mg./kg./hr. in 5 per cent glucose) prevented the fall in norepinephrine level. Mechanisms of action of methylene blue in reversing decaborane-mediated norepinephrine depletion are discussed.

Group 60 — Pharmacology

Treatment with methylene blue of individuals intoxicated with boron hydride seems more rational than the present empirical therapy. (Author)
AD-643 675 Not available from CFSTI.

EFFECT OF RESPIRATORY ACIDOSIS ON VASOCONSTRICTOR EFFECTS OF DIRECTLY AND INDIRECTLY ACTING SYMPATHOMIMETIC AMINES IN CATS,
Karolinska Institutet, Stockholm (Sweden). Dept. of Physiology.
For primary bibliographic entry see Field 6P.
AD-643 872 Not available from CFSTI.

RELEASE AND UPTAKE OF NORADRENALINE IN ADRENERGIC NERVE GRANULES,
Karolinska Institutet, Stockholm (Sweden). Dept. of Physiology.
For primary bibliographic entry see Field 6P.
AD-643 873 Not available from CFSTI.

PHARMACOLOGY OF THE SYMPATHETIC NERVOUS SYSTEM.
Interim rept.,
Goteborg Univ. (Sweden). Dept. of Pharmacology.
A. Carlsson. 1966, 12p
AFOSR-66-2183
Grants AF-EOAR-56-65, PHS-NB-04359-02
Availability: Published in International Symposium, Antihypertensive Therapy (Principles and Practice) Siena, Italy p5-14 Jun 28-Jul 3 1966.

Descriptors: (*Autonomic nervous system, *Pharmacology), Reserpine, Neuromuscular transmission, Amines, Levarterenol, Central nervous system, Amino acids, Sweden.
Identifiers: Antihypertensive agents, Methyldopa.

Several antihypertensive drugs have been shown to interfere with adrenergic transmission in the peripheral sympathetic nervous system, and the mechanisms by which the effects are brought about have been partly elucidated. Thus, reserpine has been shown to block the incorporation of the adrenergic transmitter into a complex held in specific, intracellular storage particles, leading to depletion of transmitter and block of transmission; guanethidine may act by a similar mechanism. No satisfactory explanation of the antihypertensive action of x-methyldopa has been given so far, although it has been shown to interfere with both the formation and storage of Noradrenaline and related amines. Several antihypertensive agents are able to penetrate into the central nervous system and interfere with amine-transmission mechanisms in sympathetic centres at different levels. Central effects may play an important role in the antihypertensive actions of drugs such as reserpine and x-methyldopa. (Author)
AD-643 891 Not available from CFSTI.

THE DISRUPTION OF CONDITIONED AVOIDANCE RESPONSE FOLLOWING SELECTIVE DEPLETION OF BRAIN CATECHOL AMINES,
Goteborg Univ. (Sweden). Dept. of Pharmacology.
Lennart C. F. Hanson. 9 Feb 65, 13p
AFOSR-66-2062
Grants AF-EOAR-30-64, PHS-NB-04359-02
Availability: Published in Psychopharmacologia (Berl.) v8 p100-10 1965.

Descriptors: (*Brain, *Amines), (*Conditioned reflex, Amines), Tyrosine, Serotonin, Behavior, Cats, Rats, Levarterenol, Sweden.
Identifiers: Aminoethyl pyrocatechols.

Selective depletion of catechol amines (CA) in brain--with little or no depletion of 5-hydroxytryptamine--was induced by x-methyl-tyrosine methylester-HCl. Concomitant disruption of conditioned avoidance responses (CAR) was observed in cats (Shuttle box) and rats (Skinner box). Restoration of the CA levels in the brain by L-DOPA resulted in a restoration of CAR. The data support the view that the CA of the brain are essential for CAR. The relative importance of noradrenaline and dopamine is discussed. (Author)
AD-643 892 Not available from CFSTI.

PHYSIOLOGICAL AND PHARMACOLOGICAL RELEASE OF MONOAMINES IN THE CENTRAL NERVOUS SYSTEM,
Goteborg Univ. (Sweden). Dept. of Pharmacology.
Arvid Carlsson. 1965, 16p
AFOSR-66-2182
Grants AF-EOAR-30-64, PHS-NB-04359-02
Availability: Published in Mechanisms of Release of Bilgenic Amines, Proceedings of International Wenner-Gren Symposium, Stockholm p331-46 Feb 1965.

Descriptors: (*Amines, Central nervous system), Psychotropic agents, Nerve impulses, Nerve cells, Granules, Membranes (Biology), Oxidoreductases, Enzyme inhibitors, Reserpine, Guanidines, Sweden.
Identifiers: Cell membranes, Tetrabenazine, Prenylamine, Tyramine, Guanethidine.

The mechanisms of 'internal' and 'external release' induced by drugs, are discussed. 'Internal release' appears to be caused by blockade of granule storage, e.g. by reserpine, tetrabenazine and prenylamine. 'External release' appears to require the combined blockade of granule storage and membrane pump, e.g. by tyramine and other analogues, guanethidine, a monoamine oxidase inhibitor alone or--with more striking effects--followed by reserpine, or desmethylimipramine followed by reserpine. (Author)
AD-643 907 Not available from CFSTI.

EFFECTS OF PSYCHOPHARMACOLOGIC DRUGS UPON SENSORY INFLOW IN NORMAL SUBJECTS, IN PSYCHIATRIC PATIENTS AND IN ANIMALS.
Annual rept. no. 2, 1 Oct 65-30 Sep 66,
Universidad de la Republica, Montevideo (Uruguay). Instituto de Neurologia.
Elio Garcia Austt. 4 Nov 66, 12p
Grant DA-ARO-49-092-66-G100

Descriptors: (*Psychotropic agents, Visual perception), Vision, Humans, Animals, Responses, Stimulation, Chlorpromazine, Sleep, Lysergic acids, Electroencephalography.
Identifiers: Wakefulness, Psychopharmacology, Uruguay.

Averaged visual evoked potentials are being studied in man and animals by means of a computer of average transients (CAT). Modifications incorporated to this computer are described. Effects of psychotropic drugs upon the averaged visual evoked response (VER) in normal subjects are studied. LSD 25 determined multiplication of the waves. The response amplitude increased during continuous flicker stimulation instead of decreasing as observed in controls. Chlorpromazine reduced VER amplitude both in wakefulness and sleep. Stupour and coma VER was simple, lower amplitude than normals. Stuporous subjects important changes were observed generally in conjunction with modifications in background activity indicative of changes in the level of awareness. Effects of same drugs upon visual inflow along primary and secondary visual pathways were studied in cats. LSD 25 VER changed in pattern as well as in amplitude. An increase in latency of secondary waves was evident. Chlorpromazine provoked an increase of primary response with small doses. Larger doses tended to decrease it and to reach normal amplitude. (Author)
AD-643 985 HC$3.00 MF$0.65

FURTHER TOXICOLOGIC STUDIES OF ACUTE HYDRAZINE TOXICITY IN MICE.
City of Hope Medical Center, Duarte, Calif. Dept. of Biochemistry.
For primary bibliographic entry see Field 6T.
AD-644 027 HC$3.00 MF$0.65

EFFECT OF PROBENECID ON THE LEVELS OF MONOAMINE METABOLITES IN THE RAT BRAIN,
Goteborg Univ. (Sweden). Dept. of Pharmacology.
Bengt Werdinius. 9 Nov 66, 9p
AFOSR-66-2579
Grant AF-EOAR-9-66
Availability: Published in Acta Pharmacol Toxicol v25-18-23 1967.

Descriptors: (*Amines, *Brain), Reserpine, Removal, Pharmacology, Phenothiazines, Secretion, Inhibition, Organic nitrogen compounds, Organic sulfur compounds, Benzoic acids, Rats, Sweden.
Identifiers: Probenecid, Homovanillic acid, Hydroxyindoleacetic acid, Haloperidol.

Rats, pretreated with probenecid (200 mg/kg i.p., 3.5 hours previously) showed a two-to threefold increase in the brain levels of the acid monoamine metabolites homovanillic acid and 5-hydroxyindoleacetic acid. Similarly, the reserpine- or haloperidol-induced increases in the metabolite levels were augmented by pretreatment with probenecid. It is suggested that there is an active secretion mechanism, which removes acid monamine metabolites and possibly other organic acids from the rat brain, and which is inhibited by probenecid. (Author)
AD-644 090 Not available from CFSTI.

A METHOD OF MEASURING THE EFFECT OF DRUGS ON SWEATING AS A FUNCTION OF TIME,
Defence Chemical, Biological and Radiation Labs., Ottawa (Ontario).
Arthur C. Custance. 1966, 5p DCBRL-503
Availability: Published in Canadian Medical Association Journal v95 p871-4 Oct 22 1966.

Descriptors: (*Perspiration, Measurement), (*Drugs, Perspiration), Body temperature, Exercise, Atropine, Body weight, Time studies, Inhibition, Canada.
Identifiers: Sudorimeters, Caramiphen.

By the use of an instrument (sudorimeter) for the continuous and automatic recording of sweating-rate fluctuations, the effects of certain drugs which suppress sweating can be determined as a function of time. This paper describes the novel features of the instrument, and the method of analyzing the data it provides in such a way as to secure information not otherwise obtainable. (Author)
AD-644 137 Not available from CFSTI.

ACUTE AND REPEATED INTRAVENOUS ADMINISTRATION OF 1,6-DIMETHYL-1,6-DINITROSO BIUREA TO MALE AND FEMALE RHESUS MONKEYS,
Hazleton Labs., Falls Church, Va.
Howard Feinman, and Thomas W. Tusing. 12 Oct 66, 45p Rept. no. 195
Contract PH-43-63-1168

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Dosage, Behavior, Appetite, Excretion, Body weight, Blood chemistry, Pathology, Toxic tolerances, Hematology, Hematocrit, Hemoglobin, Blood counts, Histology, Monkeys.
Identifiers: Dimethyl dinitroso biurea.

The intravenous toxicity of 1,6-dimethyl-1,6-dinitroso biurea (DDB) in male and female rhesus monkeys was evaluated following single doses at levels of 12.5, 25, 37.5, and 50 mg/kg, and following repeated doses at levels of 5.0, 10, 12.5, and

25 mg/kg/day for up to 15 days. All surviving animals were held for 30 to 31-day observation periods following administration. The compound was administered in undiluted dimethyl sulfoxide in concentrations ranging from 20 to 50 mg/ml. Lethality in both the single and repeated dose studies, and survival in the repeated dose study were dose-related. Lethality occurred earlier and at lower doses in the female monkeys. Toxic signs observed were dose-related and qualitatively similar in both single dose and repeated dose studies. Slight to moderate changes observed in the hemograms included elevated sedimentation rates, decreased hematocrit, hemoglobin, red, white, and platelet cell counts. Results of biochemical studies revealed slight to moderate increases in blood urea nitrogen and transaminase values at the higher levels. No distinctive histological alterations of the tissues were found among the animals that received single doses of the compound. Repeated doses produced a depressant effect on the bone marrow, caused inflammatory changes in the intestinal mucosa, and apparently produced acute inflammatory, possible hemorrhagic, changes in the organs of some animals that died or were sacrificed during the height of intoxication. (Author)
PB-173 671 HC$3.00 MF$0.65

PRECLINICAL TOXICOLOGIC EVALUATION OF NSC 100844, SARAMYCETIN (X-5079C),
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
Nathan Rakieten. 30 Sep 66, 131p
Contract PH-43-64-932

Descriptors: (*Cancer, Chemotherapeutic agents), (*Chemotherapeutic agents, Toxicity), Dosage, Liver function tests, Pathology, Histology, Blood pressure, Electrocardiography, Respiration, Pulse rate, Liver, Toxic tolerances, Mice, Dogs.
Identifiers: Saramycetin.

The preclinical toxicity of Saramycetin, NSC 100844, was studied following I. V. administration to mice and beagle dogs. The compound was administered for the most part as a solution in buffered saline. Hepatotoxicity at the highest dose levels was indicated by a decrease in BSP and Rose Bengal clearance and elevations in SGOT and SGPT. At all dose levels studied, except 0.1 and 0.25 mg/kg/day, 0.50 through 128 mg/kg/day BSP retention was a constant finding when studied within 30 minutes after the administration of the drug. At higher dose levels of 8, 16, 32, 64 and 128 mg/kg/day, a decrease in BSP clearance was noted at least 24 hours after the dosing period and for periods ranging from 5-8 days post treatment in the animals treated with 32, 64 and 128 mg/kg/day. In all cases studied this effect of the drug was reversible when the animals were taken off the drug. The length of time for reversibility to occur varied with the magnitude of the dose regimen. There was a direct correlation between the magnitude of BSP retention and serum levels of NSC 100844. However, BSP retention was noted in many instances at various dose levels when none of the compound could be demonstrated in the serum thus indicating that BSP retention resulted from a direct effect of the drug on the cellular mechanisms and was not due to a combination of the drug and the dye. In addition the drug caused a decrease in Rose Bengal clearance so that its effect on the liver was not limited to the clearance of a single type of dye. (Author)
PB-173 672 HC$3.00 MF$0.65

6P. PHYSIOLOGY

RESPONSE OF SMALL PULMONARY ARTERIES TO UNILOBAR HYPOXIA AND HYPERCAPNIA,
California Univ., San Francisco. Medical Center.
For primary bibliographic entry see Field 6S.
AD-643 462 Not available from CFSTI.

UNIT RESPONSES OF THE LATERAL GENICULATE BODY TO LIGHT FLASHES DURING WAKEFULNESS AND SYNCHRONIZED SLEEP.
Interim rept.,
Pisa Univ. (Italy). Istituto di Fisiologia.
L. Maffei, and G. Rizzolatti. 7 Apr 65, 5p
AFOSR-66-2003
Grant AF-EOAR-37-64
Availability: Published in Experientia v21 p599-601 1965.

Descriptors: (*Sleep, Photosensitivity (Biological)), (*Vision, Electrophysiology), (*Photosensitivity (Biological), Nerve impulses), Light, Adaptation (Physiology), Retina, Electroencephalography, Cats, Italy.
Identifiers: Lateral geniculate nucleus.

The existence of a reticular control upon the responsiveness of cells in the lateral geniculate body (LGB) is well established. The enhancement during reticular or natural arousal of the geniculate responses evoked by electric shocks to the chiasm or optic nerve shows that the influence is facilitatory in nature. It is surprising, however, that the responses evoked by light flashes actually decrease during, or soon after mesencephalic reticular stimulation. The hypothesis of an occlusion at the level of the geniculate, between reticular and retinal inputs, cannot easily account for this discrepancy. This work is an attempt to re-examine the problem by a study of the evoked responses of single LBG units. (Author)
AD-643 493 Not available from CFSTI.

COMPARATIVE NEUROPHYSIOLOGY OF VISION.
Final scientific rept.,
Pisa Univ. (Italy). Istituto di Fisiologia.
Giuseppe Moruzzi. 15 Sep 66, 13p
AFOSR-66-2764
Contract AF 61 (052)-830

Descriptors: (*Vision, Electrophysiology), Nervous system, Photoreceptors, Retina, Nerve cells, Inhibition, Stimulation, Insects.
Identifiers: Lateral geniculate nucleus.

The results of the following investigations are reported: (1) Visual control of flashing in fireflies; (2) Evidence of presynaptic inhibition in the lateral geniculate body following reticular stimulation; (3) Presynaptic inhibition in the lateral geniculate body with regard to the problem of reciprocal binocular interaction; (4) Receptor and neural responses in the cat's retina; (5) Temporal and spatial relations in retinal units; (6) Surgical immobilization of eye and pupil.
AD-643 497 Not available from CFSTI.

CONCOMITANT ADRENERGIC AND PARASYMPATHETIC FIBRES IN THE RAT IRIS.
Interim rept.,
Lund Univ. (Sweden). Dept. of Histology.
B. Ehinger, and B. Falck. 20 Jan 66, 9p
AFOSR-66-2282
Grant AF-EOAR-14-66
Availability: Published in Acta Physiol. Scand. p1-7 1966.

Descriptors: (*Autonomic nervous system, Eye), Nerve fibers, Acetylcholinesterase, Cholinesterase, Biological stains, Methylene blue, Morphology (Biology), Histology, Rats, Sweden.

A nerve net containing both acetylcholinesterase (AChE) and non-specific cholinesterases (ChE) was demonstrated in the dilator region of the rat iris with a specially developed combination of the techniques for showing cholinesterases and adrenergic nerves. There is no such correspondence between adrenergic nerve fibres and AChE-containing fibres of the iridic vessels, indicating a purely sympathetic innervation of them. Only AChE-containing fibres of the dilator region disappear appreciably upon chronic parasympathetic denervation. Chronic sympathetic denervation does not affect the cholinesterase-staining properties. The presence of a nerve net in the dilator region, not degenerating upon sympathectomy and the purely sympathetic innervation of the iridic vessels was corroborated with methylene blue stainings. Thus, adrenergic (sympathetic) and AChE-containing (mainly parasympathetic) fibres run closely together in the vegetative network of the dilator region, but the two types of fibres may also occur separately. It has as yet not been possible to identify the structure affected by the parasympathetic fibres in the dilator region. (Author)
AD-643 500 Not available from CFSTI.

CONNECTIONS BETWEEN ADRENERGIC NERVES AND OTHER TISSUE. COMPONENTS IN THE EYE.
Interim rept.,
Lund Univ. (Sweden). Dept. of Histology.
Berndt Ehinger. 3 Dec 65, 10p
AFOSR-66-2668
Grant AF-EOAR-14-66
Availability: Published in Acta Physiol. Scand. p1-8 1966.

Descriptors: (*Autonomic nervous system, *Eye), Nerve fibers, Embryos, Adults, Cornea, Tissues (Biology), Connective tissue, Muscles, Humans, Dogs, Cats, Guinea pigs, Rabbits, Histology, Sweden.

The connections between adrenergic nerve fibres and other ocular structures were studied in normal embryonic material (man, dogs, cats, guinea-pigs, and rats) as well as with a special vessel injection technique (adult rats, guinea-pigs, and rabbits). It was established that adrenergic fibres are a normal constituent of the cornea. The adrenergic nerves were more numerous in the embryo than in the adult, and also occurred within the embryonic corneal epithelium. These intraepithelial fibres disappear shortly after birth. Adrenergic fibres running in the connective tissue without connection to vessels were further found in the iris, the limbus region, the chamber angle (of the guinea-pig predominantly) and in the chorioid. It cannot be excluded that these fibres innervate some connective tissue component. In the sphincter pupillae, only a few adrenergic fibres were connected to the vessels, such as was the case also in the ciliary muscle of the guinea-pig. Under the ciliary epithelium of the ciliary body and the ciliary processes there was a thick and dense plexus of adrenergic fibres. Only a restricted number of them was associated with the vessels. The 'capillaries' of the ciliary processes were remarkable in that they seemed to possess adrenergic fibres. No adrenergic innervation to the melanophores was apparent. (Author)
AD-643 502 Not available from CFSTI.

ADRENERGIC NERVES TO THE EYE AND TO RELATED STRUCTURES IN MAN AND IN THE CYNOMOLGUS MONKEY (MACACA IRUS),
Lund Univ. (Sweden). Dept. of Histology.
Berndt Ehinger. 1966, 14p
AFOSR-66-2031
Grants AF-EOAR-5-64, PHS-NB-3637
Availability: Published in Investigative Ophthalmology v5 n1 p42-52 Feb 1966.

Descriptors: (*Autonomic nervous system, *Eye), Humans, Monkeys, Nerve fibers, Fluorescence, Muscles, Ganglia, Nerve cells, Retina, Optic nerve, Histology, Sweden.

The number of adrenergic nerves in the primate eye (Homo and cynomolgus monkey) is generally less than that seen in many lower mammals, as revealed by the fluorescence technique of Falck and Hillarp. Adrenergic nerves were found, in various numbers, to reach the limbus corneae, scleral aqueous drainage channels, dilator pupillae, sphincter pupillae, ciliary muscle, cilliary part of

the uveal meshwork of the chamber angle, choroid, lacrimal gland, tarsal muscle, and smooth muscle of the glad of Meibom. In the ciliary ganglion, monoamine-containing neurons can be found under certain conditions. The perivascular sheath of adrenergic nerves has a peculiar spacious arrangement in the iris, similar to that found in the iris of other mammals. In some of the iridic vessels, adrenergic fibers are found throughout the smooth musculature. Varicose adrenergic nerves can be found to a considerable extent in nerve trunks as they approach their target organs. The retina contains a layer of adrenergic fibers between the inner nuclear and plexiform layers. Adrenergic cell bodies are found in the inner nuclear layer and, to a lesser extent, in the ganglion cell layer. No adrenergic fibers or cells were identified in the scleral trabeculae, at the canal of Schlemm, in the sclera proper, or in the optic nerve. (Author)
AD-643 503 Not available from CFSTI.

DYNAMICS OF RETICULAR AND LIMBIC POST STIMULUS DISCHARGE.
Progress rept.,
Edsel B. Ford Inst. for Medical Research, Detroit, Mich. Dept. of Neurological and Behavioral Sciences.
Lorne D. Proctor. 1 Nov 66, 19p
AFOSR-66-2807
Grant AF-AFOSR-1037-66

Descriptors: (*Brain, Electrophysiology), Nerve cells, Electrical impedance, Nerve impulses, Stimulation, Electroencephalography, Neurology, Desoxyribonucleic acids, Cats, Monkeys, Rats.

The reticular and limbic systems post stimulus discharges were observed further, using rats, cats and Nemestrina monkeys. The few microelectrode observations in rats and cats suggested this discharge is not a neural membrane phenomena. In three Nemestrina monkeys repeated stimulation and recording from macroelectrodes revealed the following: (1) The most reliable stimuli were 80% duty cycle 'square wave' impulses with a frequency of 400 cps and voltages ranging from 6 - 15 volts with current flow of approximately 3.0 milliamperes for 10 seconds. The 80% duty cycle and 400 cps were critical parameters. (2) Stimulation in the amygdala produced 3 cps rhythmic discharges interrupted by high amplitude monophasic sharp waves or bursts of high amplitude biphasic waves in the stimulation electrode area and was usually reflected to the cortex. There was a residuum of this discharge even three days post stimulus. (3) Following some such stimulations there were large fluctuating DC shifts in the cortex and/or amygdala areas. (Author)
AD-643 511 HC$3.00 MF$0.65

A UNIT OF MEMORY.
Interim rept.,
University Coll., London (England). Dept. of Anatomy.
J. Z. Young. 1965, 5p
AFOSR-66-2007
Grant AF-EOAR-42-64
Availability: Published in New Scientist p861-3 Dec 23 1965.

Descriptors: (*Memory, Nervous system), Brain, Nerve cells, Reflexes, Learning, Conditioned reflex, Sensory perception, Cephalopoda, Touch, Vision, Great Britain.

In the author's view, memory is localized in small combinations of brain cells, which he calls 'mnemons'. Each contains alternative nerve pathways, which are either preserved or blocked in the light of experience. In this hypothesis, memory can be seen as a straightforward extension of reflex mechanisms.
AD-643 514 Not available from CFSTI.

SOME BIOLOGICAL MODELERS OF THE PAST.
Interim rept.,
General Precision, Inc., Glendale, Calif.
Edwin R. Lewis. 1966, 20p
AFOSR-66-2573
Contracts AF 49 (638)-1232, AF 33 (615)-2464
Availability: Published in Natural Automata and Useful Simulations p109-26 1966.

Descriptors: (*Models (Simulations), *Biology), Physiology, Anatomical models, History, Scientific personnel, Theory.

The paper discusses three scientists who constructed simulations of biological processes. The three modelers are Borelli, Cavendish and du Bois-Reymond. Each of their simulations led to a theory that was at first accepted, then built upon and altered and, in two of the three cases, finally rejected. But each of the three theories played an important role in the progress of biological thought and the paper describes the role of models in the development of these theories. (Author)
AD-643 617 Not available from CFSTI.

THE FUNCTIONAL SIGNIFICANCE OF SLEEP WITH PARTICULAR REGARD TO THE BRAIN MECHANISMS UNDERLYING CONSCIOUSNESS.
Interim rept.,
Pisa Univ. (Italy). Istituto di Fisiologia.
G. Moruzzi. 1965, 66p
AFOSR-66-2590
Contract AF 61 (052)-830
Availability: Published in Semaine d'Etude sur Cerveau et Experience Consciente Rome p515-77 1965.

Descriptors: (*Sleep, Electrophysiology), Nerve cells, Brain, Muscles, Electroencephalography, Mammals, Italy.
Identifiers: Rapid eye movements, Dreaming, Lateral geniculate nucleus.

The main results obtained may be summarized as follows: (1) Behavioral sleep is not necessarily associated with synchronization of the activity of brain neurons. There are episodes of desynchronized sleep, associated with rapid eye movements, twitching of the limbs and atonia of the antigravity muscles. These episodes have been observed in several mammals, including man, where they seem to be associated with dreams. They are related with the appearance of spikelike potential oscillations in the nucleus reticularis pontis caudalis and in the lateral geniculate body. (2) Several lines of evidence suggest the existence, within the medulla and the lower pons, of EEG synchronizing structures, antagonistically oriented with regard to the activating reticular system and probably related with the onset of sleep. (Author)
AD-643 706 Not available from CFSTI.

SOME EVIDENCE CONCERNING THE PHYSIOLOGICAL BASIS OF THE PERIPHERY EFFECT IN THE CAT'S RETINA,
California Univ., Los Angeles. Brain Research Inst.
James T. McIlwain. 6 Sep 65, 9p
AFOSR-66-2021
Contract AF 49 (638)-1387
Availability: Published in Experimental Brain Research v1 p265-71 1966.

Descriptors: (*Retina, Nerve cells), Ganglia, Vision, Nervous system, Physiology.

Peripheral regions of retinal ganglion cell receptive fields were investigated in cerveau isole cats using automatically presented moving stimuli. By presenting appropriate stimulus configurations it was shown that the excitatory response to peripherally moving objects (the periphery effect) is not due to an extension of receptive field surround properties in the pheriphery. The differential effects of solid and striped stimuli indicated that the effectiveness of an object in eliciting the periphery effect is related to the amount of moving edge which it presents. Arguments are presented that the periphery effect results from interactions between spatially separated receptive field organizations. Certain difficulties which these findings raise with respect to the current definition of receptive field are discussed. (Author)
AD-643 759 Not available from CFSTI.

LINEAR AND NONLINEAR MECHANISMS OF BRAIN-WAVE GENERATION,
California Univ., Los Angeles, Brain Research Inst.
Donald O. Walter, and W. Ross Adey. 9 Nov 66, 11p
AFOSR-66-2554
Contract AF 49 (638)-1387, Grant NsG-502
Published in Annals, New York Academy of Sciences p772-80.

Descriptors: *Electroencephalography, Analysis), Brain, Electrophysiology, Spectrum analyzers, Vibration, Simulation, Accelerometers, Monkeys.

Some specimen findings are exhibited about the brain's physiological responses to vibration, made through spectral analysis. The findings depended heavily on having available a comprehensive machine system for spectral analysis, by digital filtering, for records whose intensities differed by factors of more than 1000 could be processed, and calculations carried as far as inverting matrices (a notoriously sensitive calculation), without concern for excessive leakage or error build-up. (Author)
AD-643 760 HC$3.00 MF$0.65

DEPENDENCE OF SYNAPTIC TRANSMISSION ON PROTEIN METABOLISM OF NERVE CELLS: A POSSIBLE ELECTROKINETIC MECHANISM OF LEARNING,
California Univ., Los Angeles. Brain Research Inst.
Rafael Elul. 11 Jun 66, 15p
AFOSR-66-2478
Contract AF 49 (638)-1387
Supported in part by PHS.
Availability: Published in Nature v210 n5041 p1127-31 Jun 11 1966.

Descriptors: (*Learning, Nervous system), (*Nucleic acids, Learning), (*Nerve cells, Metabolism), Brain, Proteins, Nerve impulses, Memory, Desoxyribonucleic acids, Ribonucleic acids, Electrophoresis.

One of the important attributes of the present hypothesis is its generality: it does not require a complex synaptic membrane, which undergoes highly specific structural modifications during learning; neither does it necessitate correlation of firing of the pre- and post-synaptic cells. In fact, almost any change in protein structure, even if not restricted to the synaptic area, might serve the requirements of this hypothesis. Also, so long as additional modifications in protein metabolism have not occurred, the effect should persist regardless of the frequency of activation of the synapse. However, the very generality of this mechanism makes it impossible to interpret learning in terms of the present hypothesis alone. Clearly, any change in the electrokinetic potential affects all synpatic endings of the same cell to an equal degree; neuronal connectivity patterns must therefore be relieved on appropriately to channel the adaptive changes. (Author)
AD-643 762 Not available from CFSTI.

PUNCH-CARD INFORMATION RETRIEVAL SYSTEMS FOR FLASHBLINDNESS PROTECTION RESEARCH. I. PHOTOCHROMIC MATERIALS.
Technical rept., Jan 65-Jan 66,

Army Natick Labs., Mass. Clothing and Organic Materials Div.
Richard N. MacNair. Nov 66, 41p C/OM-24
USA-NLABS-TR-67-14-CM

Descriptors: (*Flashblindness, Information retrieval), (*Photochromism, Flashblindness), Punched cards, Programming (Computers), Input-output devices, Physiology, Data processing systems, Organic compounds, Blindness.

The information retrieval system described was set up to include photochromic materials, organic semiconductors, image converter devices, and other protective systems. Two types of data are coded in the system: (1) General information; including authors, publications, dates, and comments. (2) Specific data for individual compounds and subjects. The specific data described in this report pertain to photochromic materials, the area of present in-house research at the U. S. Army Natick Laboratories (NLABS). Subject and compound codes for other areas will be prepared and reported separately when needed. Methods for coding the data on 5 x 8-inch, double-row hand punch cards are presented. Information is retrieved in any order by sorting the coded cards for subjects, authors, dates, and publications, thus providing a versatile system for obtaining any information previously coded.
AD-643 772 HC$3.00 MF$0.65

METABOLIC PERIODICITY IN ADRENAL GLANDS CULTURED FROM ARCTIC RODENTS.
Arctic Inst. of North America, Washington, D. C.
For primary bibliographic entry see Field 6C.
AD-643 784 Not available from CFSTI.

ELASTIC ENVIRONMENT OF THE CAPILLARY BED,
California Inst. of Tech., Pasadena. Div. of Engineering and Applied Science.
Y. C. Fung, Benjamin W. Zweifach, and Marcos Intaglietta. 5 Apr 66, 21p
AFOSR-66-2420
Contract AF 49 (638)-1364, Grant PHS-HE-08977
Prepared in cooperation with New York Univ. Medical Center.
Availability: Published in Circulation Research v19 p441-61 Aug 1966.

Descriptors: (*Capillaries, Elasticity), Tissues (Biology), Shear stresses, Membranes (Biology), Gels, Rabbits, Mathematical analysis, Structural properties.

To determine the degree to which the capillary blood vessels in vivo are supported by the elasticity of the surrounding tissue, a study was made of the elastic properties of the mesentery of the rabbit. A torsion test was made on a circular membrane of the avascular region of the mesentery, by applying a graded static torque and measuring the resulting deformation. The mesentery was found to have a modulus of rigidity in the same category as that of larger arteries and veins. It has a nonlinear stress-strain relationship with a tendency to harden at larger strains. In torsion experiments, the shear modulus G can be reduced to the following form $G = mu + c2/tau/$. Where c2 is a constant and /tau/ is the absolute value of the shear stress. The constant mu depends on the initial tension in the membrane. For the mesentery specimens, mu ranges from 215 to 1900 gm/sq cm, whereas the nondimensional constant c2 has an average value of 8.23 with a standard deviation of 2.1. The hypothesis is advanced that the medium in which the capillaries of the mesentery are embedded is a gel and the capillary in effect is a tunnel in this gel. Such a hypothesis could explain the apparent rigidity of the blood capillaries. (Author)
AD-643 793 Not available from CFSTI.

EFFECT OF RADIATION AND AGING ON OCULAR LENS PROTEINS,
Rochester Univ., N. Y.
For primary bibliographic entry see Field 6R.
AD-643 806 Not available from CFSTI.

ACOUSTIC REFLEXOMETRY,
Naval Air Engineering Center, Philadelphia, Pa. Aerospace Crew Equipment Lab.
Emanuel S. Mendelson. 28 Nov 66, 18p NAEC-ACEL-541
NAVMED-MR005.04-0015
Availability: Published in Acta Oto-Laryngologica v62 n2 p125-39 1966.

Descriptors: (*Ear, Reflexes), Audiometry, Hearing, Muscles, Auditory perception, Thresholds (Physiology), Stimulation, Responses.

A more systematic and rapidly conducted procedure has been devised for auditory stimulation, in the manometric testing of acoustic reflex reactions. The stimuli are brief pulses of changing tones. They are swept from one end of the test frequency scale to the other during a single, uninterrupted recording, at starting amplitudes below or just above reflex threshold. Stimulus strength is raised progressively between repetitive recordings from the same ear. The results have facilitated the comparison of reflex reactions with relation to the stimuli. Wide differences have been found in the effectiveness of particular stimuli and in the appearance of the responses, in a small group of normal subjects. In a few individuals the recorded reactions to some of the stimulus combinations have varied in either a single ear or in both ears. The most extreme type of change has been between momentary protrusion and momentary retraction of the tympanic membrane. The method has yielded consistent results throughout single tests and in repeated tests on the same subject. (Author)
AD-643 857 Not available from CFSTI.

EFFECT OF RESPIRATORY ACIDOSIS ON VASOCONSTRICTOR EFFECTS OF DIRECTLY AND INDIRECTLY ACTING SYMPATHOMIMETIC AMINES IN CATS,
Karolinska Institutet, Stockholm (Sweden). Dept. of Physiology.
S. Bygdeman. 23 Oct 65, 7p
AFOSR-66-2070
Grant AF-EOAR-52-65
Availability: Published in Acta physiol scand v66 p444-7 1966.

Descriptors: (*Amines, Acidosis), (*Sympathomimetic agents, Acidosis), (*Acidosis, Respiration), Cardiovascular system, Levarterenol, Arteries, Obstruction (Physiology), Carbon dioxide, Responses, Chemoreceptors, Sweden.
Identifiers: Aminoethyl pyrocatechols, Tyramine, Phenylethylamine.

The peripheral vasoconstrictor effects of bilateral carotid occlusion were compared with those of the direct-acting sympathomimetic drugs noradrenaline and dopamine and of the indirectly acting drugs tyramine and phenylethylamine on the perfused hindley of cats during normal ventilation and respiratory acidosis. It was observed that while ventilation with 15% CO2 decreased the vasoconstrictor response to injected noradrenaline and dopamine by 60 per cent effects of tyramine, phenylethylamine and carotid occlusion remained unchanged. The results suggest that hypercarbia does not interfere with the action of endogenously liberated transmitter in the synaptic region but blocks the effect of injected noradrenaline and dopamine on receptors situated outside this region. (Author)
AD-643 872 Not available from CFSTI.

RELEASE AND UPTAKE OF NORADRENALINE IN ADRENERGIC NERVE GRANULES,
Karolinska Institutet, Stockholm (Sweden). Dept. of Physiology.
U. S. von Euler. 1966, 14p
AFOSR-66-2553
Grant AF-EOAR-7-66
Availability: Published in Acta physiol scand v67 p430-40 1966.

Descriptors: (*Levarterenol, Autonomic nervous system), Neuromuscular transmission, In vivo analysis, Heart, Nerves, Bovines, Glands, Secretion, Spleen, Amines, Chemoreceptors, Sympatholytic agents, Decaboranes, Nerve cells, Sweden.
Identifiers: Tyramine.

A brief review is given of some recent findings concerning noradrenaline (NA) release and uptake in isolated nerve granules and in connection with neurotransmission in vivo. The main results are summarized in the following points. Rabbit heart granules have similar NA release rate and other properties as bovine nerve granules. Granules from the bovine vesicular gland show about 3 times lower NA release rate and differ in other respects from splenic nerve granules. Tyramine inhibits the uptake of NA in partially depleted isolated splenic nerve granules. Adrenergic alpha and beta-blockers lower the NA release rate and inhibit NA uptake in splenic nerve granules, suggesting common features of the 'receptor' mechanisms in granules and effector cells. Intermittent sympathetic nerve stimulation in decaborane depleted rabbits causes transmission failure which is partially overcome by 'neuronal rest' and injection of NA or dopamine. Although homogenization experiments indicate that most of the NA in axones and nerve endings occur in granule bound form it is assumed that part of the NA is present as 'transport NA' in loosely bound form available for immediate release. (Author)
AD-643 873 Not available from CFSTI.

INFLUENCE OF SLEEP AND WAKEFULNESS ON THE RESPONSE OF LATERAL GENICULATE UNITS TO SINEWAVE PHOTIC STIMULATION.
Interim rept.,
Pisa Univ. (Italy). Istituto di Fisiologia.
L. Maffei, G. Moruzzi, and G. Rizzolatti. 1965, 15p
AFOSR-66-2066
Grant AF-EOAR-37-64
Availability: Published in Arch. Ital. Biol. v103 p596-608 1965.

Descriptors: (*Sleep, Photosensitivity (Biological)), Nervous system, Retina, Electroencephalography, Responses, Brain, Electrophysiology, Cats, Italy.
Identifiers: Wakefulness, Lateral geniculate nucleus.

Units of the lateral geniculate body (LGB) were recorded in the unanesthetized, midpontine pretrigeminal cat. A sinewave oscillation of light intensity, at different frequencies (from 0,1 to 1 cps), was used for visual stimulation. During behavioral and EEG wakefulness the firing of LGB units is modulated by the sinewave light in an almost linear fashion. The oscillation of the firing rate appears to be perfect replica of the sinewave. The 'on' cells are in phase with the stimulus, the 'off' cells are 180 degrees out of phase; and the 'on-off' cells present a stimulus-response phase relationship between 0 and 180 degrees. During synchronized sleep every relation between sinewave stimulus and response disappears. Control experiments, as well as several considerations, suggest that the hypnic 'escape' of LGB units from the modulating influence of sinewave light may be due to the withdrawal of extra-retinal volleys, possibly mediated by reticulo-geniculate pathways. (Author)
AD-643 880 Not available from CFSTI.

THE DISRUPTION OF CONDITIONED AVOIDANCE RESPONSE FOLLOWING SELECTIVE DEPLETION OF BRAIN CATECHOL AMINES,

Goteborg Univ. (Sweden). Dept. of Pharmacology.
For primary bibliographic entry see Field 6O.
AD-643 892 Not available from CFSTI.

PHYSIOLOGICAL AND PHARMACOLOGICAL RELEASE OF MONOAMINES IN THE CENTRAL NERVOUS SYSTEM,
Goteborg Univ. (Sweden). Dept. of Pharmacology.
For primary bibliographic entry see Field 6O.
AD-643 907 Not available from CFSTI.

ADRENERGIC AND CHOLINERGIC AXONS IN THE MOUSE IRIS,
Lund Univ. (Sweden). Dept. of Histology.
B. Ehinger, and B. Gustafsson-Sporrong. 2 Dec 65, 4p
AFOSR-66-2098
Grant AF-EOAR-66-14
Availability: Published in Experientia v22 218p 1966.

Descriptors: (*Autonomic nervous system, *Eye), Morphology (Biology), Nerve fibers, Nerve cells, Histology, Mice, Sweden.

In the dilator pupillae, which was formerly regarded as purely sympathetically innervated, a dense network of cholinergic fibres has recently been demonstrated. Moreover, the adrenergic and cholinergic fibres could be shown to run concomitantly in the Schwann cell strands of the autonomous ground-plexus, demonstrating morphological foundations for a peripheral interaction between the two types of vegetative nerves. The observation that there is generally only one adrenergic fibre in each strand of Schwann cells in the mouse iris has opened a simple way of demonstrating directly to what extent adrenergic nerve fibres are accompanied by non-adrenergic axons. (Author)
AD-643 939 Not available from CFSTI.

DISTRIBUTION OF ADRENERGIC NERVES IN THE EYE AND SOME RELATED STRUCTURES IN THE CAT,
Lund Univ. (Sweden). Dept. of Histology.
Berndt Ehinger. 17 May 65, 11p
AFOSR-66-2069
Grants AF-EOAR-5-64, PHS-NB-05236-01
Availability: Published in Acta physiol scand v66 p123-8 1966.

Descriptors: (*Autonomic nervous system, *Eye), Nerves, Histological techniques, Fluorescence, Cornea, Connective tissue, Nerve fibers, Retina, Nerve cells, Ganglia, Muscles, Morphology (Biology), Amines, Cats, Sweden.

With the specific and highly sensitive fluorescence technique of Falck and Hillarp, the distribution of adrenergic nerves was studied in the eye and some related structures in the cat. Adrenergic nerves occur in the cornea, in the loose connective tissue at the limbus, in the tissues of the chamber angle and in the iridic stroma. The large vessels of the iris possess the same spacious arrangement of the adrenergic fibres as is seen in many other mammals. Both the sphincter and the dilator pupillae have a rich supply of varicose adrenergic fibres. There is a layer of varicose adrenergic fibres under the ciliary epithelium and in the ciliary processes. In the retina, there is a layer of adrenergic fibres between the inner nuclear and the inner plexiform layers, as well as adrenergic nerve cells both in the inner nuclear layer and ganglion cell layer. The tarsal muscle as well as the muscle of the nictitating membrane has a wide-meshed plexus of adrenergic nerves. In the lacrimal gland, seemingly every secretory cell is reached by an adrenergic fibre. (Author)
AD-643 940 Not available from CFSTI.

HISTOCHEMISTRY OF MONOAMINERGIC MECHANISMS IN PERIPHERAL NEURONS,
Lund Univ. (Sweden).
B. Falck, and Ch Owman. 1966, 16p
AFOSR-66-2076
Grants AF-EOAR-5-64, PHS-NB-05236-01
Supported in part by Association for the Aid of Crippled Children, New York, and Swedish Medical Research Council.
Availability: Published in Mechanisms of Release of Biogenic Amines, Proceedings of an International Wenner-Grenn Symposium, Stockholm, p59-72 February 1965.

Descriptors: (*Amines, *Nerve cells), Peripheral nervous system, Fluorescence, Histological techniques, Epinephrine, Levarterenol, Serotonin, Formaldehyde, Tissues (Biology), Sweden.
Identifiers: Aminoethyl pyrocatechols.

Basic features of the peripheral monoaminergic neuron are discussed in terms of findings obtained by a recently devised fluorescence microscopic method for the cellular localization of dopamine, noradrenaline, adrenaline, and 5-hydroxytryptamine. Material fluorescence occurs when the catecholamines and 5-hydroxytryptamines in the presence of protein condense with formaldehyde. This method is applicable for demonstrating tissue monoamines. Varying species divergencies when studying corresponding structures adrenergic innervation patterns are cited. (Author)
AD-643 941 Not available from CFSTI.

ORIGINE DES MESSAGES SOMATO-SENSITIFS ACTIVANT LES CELLULES DU CORTEX MOTEUR CHEZ LE SINGE (Origin of Somato-Sensitive Messages Activating the Motor Cortex Cells of the Monkey),
Centre d'Etudes de Physiologie Nerveuse et d'Electrophysiologie, Paris (France).
Denise Albe-Fessard, and John Liebeskind. 8 Oct 65, 22p
AFOSR-66-2283
Grant AF-EOAR-34-65
Text in French; Attached summary in English.
Availability: Published in Experimental Brain Research v1 p127-46 1966.

Descriptors: (*Neuromuscular transmission, Electrophysiology), Motor reactions, Brain, Muscles, Extremities, Stimulation, Nerve cells, Nerve impulses, Monkeys, France.

Previous experiments in monkey motor cortex have described activity evoked by somatic stimulation. The aim of the present work was to study the properties and peripheral origins of this projection at the level of single cells. To this end, electric and natural stimuli were used and dissections of peripheral tissues were frequently made. Parallel experiments in the postrolandic gyrus were conducted to serve as a basis for comparing our results in motor cortex with the larger body of work concerning the primary somatic region. (1) Somatotopy, the general rule in the somatic area, exists also in motor cortex but in lesser degree. (2) Convergence of afferent messages on motor cortex cells is frequently observed. This convergence differs greatly from that seen in non-specific areas, consisting often of a complex pattern of excitatory and inhibitory processes recalling the mode of reciprocal innervation. (3) The large majority of motor cortex cells studied were driven by passive movements of the limbs, never by light tactile stimulation which was most frequently effective in the somatic cortex. (Author)
AD-643 946 Not available from CFSTI.

PHYSIOLOGICAL JOURNAL OF THE USSR (SELECTED ARTICLES),
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. A. Baryshnikov, D. A. Biryukov, and V. G. Tolkunov. 27 Jun 66, 35p FTD-TT-66-3
TT-67-60275
Unedited rough draft trans. of Fiziologicheskii Zhurnal SSSR v48 n1 p1-8, 39-46 1962.

Descriptors: (*Physiology, USSR), Physical fitness, Recreation, Children, Agriculture, Animals, Digestive system, Nervous system, Osmotic pressure, Thalamus, Arteries, Veins, Liver, Electrophysiology, Nerve cells, Sense organs, Symposia.

Contents: XXII Conference of the KPSS (Communist Party USSR) and Certain Important Physiological Problems;Bioelectric Activity of Single Hypothalamus Neurons at Brief Displacements of Osmotic Pressure in the Basin of Internal Carotid and Portal Vein of the Liver.
AD-643 983 HC$3.00 MF$0.65

NATURE OF ELECTRIC POTENTIALS OF THE TONGUE-PHARYNGEAL NERVE DURING TASTE IRRITATION OF THE TONGUE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. T. Sakhiulina. 14 Jul 66, 8p FTD-HT-66-199
TT-67-60279
Unedited rough draft trans. of Byulleten Eksperimentalnoi Biologii i Meditsiny (USSR) v19 p66-8 1944.

Descriptors: (*Tongue, Electrophysiology), Nerves, Throat, Taste, Stimulation, Anesthesia, Cats, Hydrochloric acid, USSR.

On the basis of obtained data it is assumed that during the release of electric potentials from the tongue-pharyngeal nerve, irritation of the tongue by various concentrations of hydrochloric acid causes pulses of various nature. (Author)
AD-643 992 HC$3.00 MF$0.65

THE EFFECT OF BEDREST ON VARIOUS PARAMETERS OF PHYSIOLOGICAL FUNCTION. PART X - THE EFFECT OF BEDREST ON THE CIRCULATORY RESPONSE TO A VALSALVA MANEUVER.
Texas Inst. For Rehabilitation And Research, Houston.
D. Cardus, W. A. Spencer, C. Vallbona, and F. B. Vogt. Dec 66, 17p NASA-CR-180
Contract NAS9-1461

Descriptors: *Bed rest, *Blood pressure, *Valsalva maneuver, Adrenergics, Artery, Bed, Blood, Body, Change, Human, Hypotension, Maneuver, Orthostatic, Performance, Physiology, Pressure, Quantity, Rest, Tolerance.

For abstract, see STAR 05 02.
N67-11946 HC$3.00 MF$0.65

CLINICAL NUTRITIONAL STUDY OF MINIMUM PROTEIN AND CALORIC REQUIREMENTS FOR MAN ANNUAL REPORT, SEP. 1964 - SEP. 1965.
California Univ., Berkeley. Dept. Of Nutritional Sciences.
D. H. Calloway, and S. Margen. Sep 66, 266p
NASA-CR-79394
Contract NGR-05-003-068

Descriptors: *Human tolerance, *Nutritional requirement, *Tolerance (biol), Balance, Blood, Change, Chemistry, Clinical, Effect, Electrolyte, Endogenous, Excretion, Experiment, Human, Loss, Man, Metabolism, Minimum, Nitrogen, Nutrition, Protein, Requirement, Weight.

For abstract, see STAR 05 02.
N67-12237 HC$3.00 MF$0.65

STEREOPSIS AND BINOCULAR RIVALRY OF CONTOURS,
Bell Telephone Labs., Inc., Murray Hill, N. J.
Bela Julesz. 30 Jan 63, 6p

Pub. in Journal of the Optical Society of America v53 n8 p994-99 Aug 1963. NSF Scientific Documentation Project.

Descriptors: (*Space perception, Brightness), Vision, Optical images.
Identifiers: Binocular vision.

Ten experiments were performed with computer-generated stereo images devoid of familiarity cues to investigate the role of contours in binocular depth perception. Contours were defined as the local maxima of brightness gradients in the monocular fields. In some of the experiments one or both of the stereo fields consisted of outlines drawn at the contours of the original fields. Primary attention was given to sensitivity to position of corresponding contours and outlines. The results indicate that in the absence of drawn outlines or if both stereo images are outlined, stereopsis is insensitive to relative position. On the other hand, if only one of the stereo images is outlined, position is critical. Whenever stereopsis is obtained, a uniform expansion of one image by 10% preserves stereopsis. It is shown that stereopsis of complemented simple outlines (similar to the stimuli used in Helmholtz's classical experiment) gets increasingly more difficult as the spatial density of outlines is raised. (Author)
PB-173 669 HC$3.00 MF$0.65

6Q. PROTECTIVE EQUIPMENT

EVALUATION OF THE PHYSIOLOGICAL PROTECTIVE EFFICIENCY OF A NEW PROTOTYPE DISPOSABLE PASSENGER OXYGEN MASK,
Civil Aeromedical Inst., Oklahoma City, Okla.
Ernest B. McFadden. Apr 66, 27p
AM-66-7

Descriptors: (*Oxygen masks, Efficiency), Breathing apparatus, Protective clothing, Responses, Respiration, Altitude chambers, Body temperature, Oximeters, Exercise, Experimental design, Aviation medicine.
Identifiers: Passengers.

A prototype of a new design disposable passenger mask applicable for emergency use in jet transports at altitudes to 40,000 feet was evaluated. Six subjects instrumented to obtain a variety of physiological information were exposed to a chamber flight profile designed around the National Aerospace Standard 1179. The two alternative methods of determining mask performance suggested in this document and based on gas analysis and blood oxygen saturation were used simultaneously in this study. In order to stimulate the respiration to the 30-liters/minute volume levels specified in applicable regulations, the subject exercised on a bicycle ergometer through the chamber flight up to and including 40,000 feet. Air-breathing baselines were established at 10,000 and 14,000 feet with the subject resting. The 14,000-foot baseline determination was repeated at 14,000 feet exercising at the same work load level as used in the high-altitude tests. The mask maintained all subjects in a satisfactory physiological condition at all altitudes up to and including 40,000 feet for the duration of exposure used in these tests. (Author)
AD-644 118 HC$3.00 MF$0.65

6R. RADIOBIOLOGY

BETA DOSE RATES FROM NEUTRON-IRRADIATED URANIUM-235 CARBIDE PARTICLES,
Naval Radiological Defense Lab., San Francisco, Calif.
J. F. Pestaner, D. A. Kubose, and W. R. Balkwell. 30 Jun 66, 29p USNRDL-TR-1082

Descriptors: (*Beta particles, Dose rate), (*Dose rate, Fission products), Uranium compounds, Radioactivity, Carbides, Radioactive fallout, Radiation hazards, Particle size, Dosimeters, Ionization chambers.

Small highly radioactive particles could be injected into the biosphere from the re-entry and burnup of a nuclear propulsion reactor. This would constitute a potential radiological hazard to man. The work reported is the experimental measurement of beta dose rates from fission products contained in pyrolytic-carbon-coated uranium-235 carbide beads of core diameter 90, 120 and 260 microns. The dose was measured in an extrapolation chamber using tissue equivalent electrodes. The beta dose from the irradiated particles delivered to a segment of tissue can be calculated using a rate law derived from the experimental values.
AD-643 651 HC$3.00 MF$0.65

EFFECT OF RADIATION AND AGING ON OCULAR LENS PROTEINS,
Rochester Univ., N. Y.
W. F. Forbes, and S. Lerman. 1966, 5p
Grants PHS-RH-00392, PHS-B-3081
Prepared in cooperation with Waterloo Univ., Ontario, Dept. of Chemistry. Supported in part by Defense Research Board of Canada.
Availability: Published in International Congress of Gerontology (7th), Vienna, Austria p165-8 Jun 26-Jul 2, 1966.

Descriptors: (*Radiation effects, *Eye), (*Aging (Physiology), Eye), Metabolism, Proteins, Whole body irradiation, Thiols, Rats.

The lens was chosen as a good protein for aging studies because lenses from animals of different ages are readily obtained; because the lens represents a relatively simple biological system, being devoid of a blood supply and having no interchange of cells between the lens and surrounding media after a very early age. It is also known to give rise to age-related changes such as the senile cataract. The data provide evidence that for gamma-crystallin, effects of radiation and aging cause some similar physico-chemical changes; namely, a semi-quantitatively similar conversion of thiol- to disulfide-groups. (Author)
AD-643 806 Not available from CFSTI.

THE EFFECT OF RADIATION ON COLLAGEN. I. ELECTRON-SPIN RESONANCE SPECTRA OF 2537-A-IRRADIATED COLLAGEN,
Rochester Univ., N. Y. Dept. of Biochemistry.
W. F. Forbes, and P. D. Sullivan. 1 Oct 65, 8p
Grant PHS-RH-00392-01
Prepared in cooperation with Waterloo Univ. (Ontario). Dept. of Chemistry.
Availability: Published in Biochemica et Biophysica Acta v120 p222-8 1966.

Descriptors: (*Radiation effects, *Collagen), (*Electron spin resonance, Collagen), Ultraviolet radiation, Tyrosine, Phenylalanine, Radioactive decay, Gelatins, Amino acids, Aging (Physiology).

Samples of human collagen, when irradiated with 2537-A light, afford electron-spin resonance spectra which differ markedly from the electron-spin resonance spectra reported after exposure of collagen samples to X-rays. The signals from ultraviolet light-irradiated collagen are tentatively associated with unpaired electrons located predominantly on the aromatic nuclei of the tyrosine and phenylalanine residues. The collagen signals show characteristic decay rates which also suggest the existence of two distinct radical sites. The decay rates are different for collagen, gelatin and molecular mixtures of approx. the same amino acid composition. The intensities and decay rates of the signals show changes which can be related to the age of the individual samples. On standing, a new electron-spin resonance signal was formed in several cases, which may be due to a trapped .CHO radical. (Author)
AD-643 807 Not available from CFSTI.

THE RADIATION RESISTANCE OF LONG-LIVED LYMPHOCYTES AND PLASMA CELLS IN MOUSE AND RAT LYMPH NODES.
Technical rept.,
Naval Radiological Defense Lab., San Francisco, Calif.
J. J. Miller, III., and L. J. Cole. 23 Sep 66, 28p
USNRDL-TR-1074
NAVMED-MR005.08-0005

Descriptors: (*Lymphocytes, *Radiation tolerance), (*Radiation effects, *Antigens + antibodies), (*Immunity, Radiation effects), X rays, Lymph, Thymidines, Tritiated compounds, Resistance (Biological), Mice, Rats.
Identifiers: Plasma cells.

Rats and mice were given a secondary immunological stimulus with TAB vaccine and then were given twice daily injections of tritiated thymidine for 4 days into the hind foot pad. Thirty days later the mice were exposed to 850 rad, 500 rad, or were left nonirradiated and the rats were exposed to 850 rad or left nonirradiated. Despite a marked, generalized destruction of lymphocytes, the aortic nodes of the mice and the popliteal nodes of the rats had larger values for percent of small lymphocytes labeled in the period immediately following irradiation than did the nodes from the nonirradiated control animals. The mean grain counts of the labeled small lymphocytes from irradiated animals were equal to or larger than those from nonirradiated animals. These results are interpreted as demonstrating a relative radio-resistance of long-lived, lymph node lymphocytes. Large numbers of persistently labeled plasma cells were also found in lymph nodes after irradiation. No difference could be found in the numbers or distribution of labeled plasma cells in lymph nodes from irradiated mice compared to lymph nodes from nonirradiated mice. There may have been a loss of a small proportion of the long-lived plasma cells present in the rat lymph nodes. It is believed that the ability of plasma cells to survive irradiation explains the radio-resistance of established antibody production. (Author)
AD-644 116 HC$3.00 MF$0.65

APPARENT ABSENCE OF RECOVERY IN ENDOGENOUS COLONY-FORMING CELLS AFTER IRRADIATION UNDER HYPOXIC CONDITIONS.
Technical rept.,
Naval Radiological Defense Lab., San Francisco, Calif.
T. L. Phillips, and G. E. Hanks. 24 Oct 66, 35p
USNRDL-TR-1086
NAVMED-MR005.08-0017

Descriptors: (*Radiation effects, *Cells (Biology)), (*Hypoxia, *Radiation injuries), Radiological dosage, X rays, Oxygen, Regeneration, Survival, Recovery, Rats.
Identifiers: Radiosensitivity.

Groups of LAF sub 1 adult mice were subjected to both graded and divided doses of radiation under hypoxic conditions and in air. The endogenous spleen colony-forming unit technique was used to measure the effect of the irradiation on survival of the colony-forming cells. Dose-response curves indicated a D sub 0 of 122 rads in air and 273 rads under hypoxic conditions, an oxygen enhancement ratio of 2.2. Using 2 doses each of 315 rads in air and of 630 rads under hypoxia, survival ratios were obtained for times between 3 and 36 hours. Animals irradiated in air show peaks in the survival ratio at 9 and at 27 hours. The initial peak is probably the result of early repair within the cell and the second peak that of onset of regeneration. The survival ratio of the animals irradiated under hypoxic conditions was not increased but rather fell slightly at times following the initial point. The results suggest that the degree of early cellular re-

pair is markedly decreased and the onset of proliferation is delayed when radiation injury occurs under conditions of hypoxia. (Author)
AD-644 117 HC$3.00 MF$0.65

ENDOGENOUS BIOCHEMISTRY OF PLANARIANS CORRELATED WITH LEARNING EXPERIMENTS AT BROOKHAVEN NATIONAL LABORATORY,
Brookhaven National Lab., Upton, N. Y.
Simon Freed. Dec 65, 21p
Contract AT (30-2)-GEN-16

Descriptors: (*Worms, Biochemistry), (*Radioactivity, Worms).

For abstract, see NSA 20 24.
BNL-981 HC$3.00 MF$0.65

POINT SOURCE DETECTION BY SCINTILLATION SURVEY METER,
New York Operations Office (AEC), N. Y. Health and Safety Lab.
Robert T. Groveson. Jul 66, 38p

Descriptors: (*Gamma rays, Sensitivity), (*Detection, Gamma rays).

For abstract, see NSA 20 24.
HASL-177 HC$3.00 MF$0.65

AUTOMATIC SAMPLER FOR COLLECTING RADIOACTIVE PARTICULATES IN GROUND LEVEL AIR,
New York Operations Office (AEC), N. Y. Health and Safety Lab.
D. C. Freerwich. Aug 66, 25p

Descriptors: (*Radioactivity, Scintillation counters), (*Radiation measurement systems, Radiological contamination).

For abstract, see NSA 20 24.
HASL-178 HC$3.00 MF$0.65

IMMUNE RESPONSE TO A SECONDARY STIMULUS WITH LEPTOSPIRA CANICOLA AND INFECTIOUS CANINE HEPATITIS IN BEAGLES EXPOSED TO 90 SR,
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex. Dept. of Microbiology.
For primary bibliographic entry see Field 6C.
For abstract, see NSA 20 24.
LF-29 HC$3.00 MF$0.65

RESEARCH AND DEVELOPMENT PROGRAM FOR RADIATION MEASUREMENTS OF RADIOBIOLOGICAL HAZARDS OF MAN IN SPACE SUMMARY TECHNICAL REPORT, 1 AUG. 1965 - 31 JUL. 1966.
Hughes Research Labs., Malibu, Calif.
31 Jul 66, 42p NASA-CR-73040
Contract NAS2-2366

Descriptors: *Dosimetry, *Proportional counter, *Proton irradiation, *Radiation distribution, Aluminum, Counter, Data, Design, Detector, Distribution, Electrode, Gold, Human, Macroscopy, Microscopy, Proportion, Radiation, Silicon, Tissue, Tolerance.

For abstract, see STAR 05 02.
N67-11985 HC$3.00 MF$0.65

NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 31, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18H.
For abstract, see NSA 20 24.
ORNL-3973 Vol 1 HC$3.00 MF$0.65

GLOVEBOX HANDLING OF GRAM QUANTITIES OF 244 CM AT ROCKY FLATS,
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
R. A. Kirchner, K. J. Freiberg, and E. A. Putzier.
29 Sep 66, 6p
Contract AT (29-1)-1106

Descriptors: (*Curium, Handling), (*Radiological contamination, Laboratory equipment).

For abstract, see NSA 20 24.
RFP-811 HC$3.00 MF$0.65

A GRAPHICAL METHOD FOR CALCULATING THE DOSE IN MAN FROM INDIVIDUAL RADIONUCLIDES IN FALLOUT,
California Univ., Livermore. Lawrence Radiation Lab.
C. Ann Burton. 3 Jun 66, 20p
Contract W-7405-eng-48

Descriptors: (*Radioactive fallout, Humans), (*Humans, Radiological dosage).

For abstract, see NSA 20 24.
UCRL-14922 HC$3.00 MF$0.65

6S. STRESS PHYSIOLOGY

RESPONSE OF SMALL PULMONARY ARTERIES TO UNILOBAR HYPOXIA AND HYPERCAPNIA,
California Univ., San Francisco Medical Center.
Mikio Kato, and Norman C. Staub. 11 Apr 66, 16p
Contract Nonr-222 (55), Grant PHS-HE-06285
Availability: Published in Circulation Research v19 p426-40 Aug 1966.

Descriptors: (*Hypoxia, *Arteries), Lungs, High altitude, Carbon dioxide, Oxygen, Blood circulation, Respiration, Respiratory system, Obstruction (Physiology), Cats.
Identifiers: Hypercapnia.

The internal diameters of small muscular pulmonary arteries in the right and left lower lobes of lungs rapidly frozen in the anesthetized, open-thorax cat were measured. In every cat the right lower lobe was ventilated with the test gas and all other lobes were ventilated with O2. In 4 cats, the test gas supplied to the right lower lobe was also O2 (control experiments); in 6, it was 100% N2 and in 6 it was 90% N2-10% CO2. In the 4 controls, there was no difference between the internal diameters of corresponding arteries in the right and left lower lobes. In the other 12 cats, there was a highly significant decrease in the diameter of arteries in the right lower lobe that correlated well with a large decrease in blood flow to that lobe, calculated using a shunt equation. Ventilation of the right lower lobe with 10% CO2 in air (4 cats) did not affect the diameter of arteries and ligation of the pulmonary artery to the right lower lobe resulted in only a slight decrease in arterial dimensions in 3 of 4 cats. These data show that in regional alveolar hypoxia without systemic hypoxia the muscular pulmonary arteries of the terminal respiratory units in the hypoxic region actively constrict. The constriction occurs with or without alveolar hypercapnia. (Author)
AD-643 462 Not available from CFSTI.

RESPONSE OF THE RHESUS MONKEY TO LATERAL IMPACT,
Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
Farrel R. Robinson, R. L. Hamlin, W. M. Wolff, and R. R. Coermann. Jan 63, 12p AMRL-TR-65-5
Availability: Published in Aerospace Medicine v34 n1 p56-62 Jan 1963.

Descriptors: (*Impact shock, Tolerances (Physiology)), Acceleration tolerance, Deceleration, Heart, Electrocardiography, Radiography, Blood chemistry, Monkeys, Space medicine.

The experiments provided information regarding the physiological and mechanical response of well protected animate systems subjected to lateral impacts. Rhesus monkeys were subjected to 11 laterally applied impacts over a 6 month period. The impacts ranged from 5 to 75 g with pulse durations of 70 to 27 milliseconds, respectively. Marked resonances of the head and hip occurred in the 30 millisecond pulse duration range. There appeared to be a resonance of the chest in the 60 millisecond range and either another resonance or the shifted resonance in the 30 millisecond range. The most important biological effect of the impacts was the response of the heart in the form of conduction abnormalities. The maximum response occurred immediately after the 55 g impacts. There were twice the number of abnormalities recorded from left lateral impacts as compared to right lateral impacts. Radiographs showed no skeletal fractures. Movement and/or dilatation of the heart was evident on the side receiving the impact. Routine hemogram and serum glutamic-oxalacetic transaminase values showed no change due to the impacts. Protection provided by the individually fitted body molds is discussed, particularly with reference to the heart. (Author)
AD-643 797 Not available from CFSTI.

CARDIAC ARRHYTHMIAS OCCURRING DURING ACCELERATION,
Technical rept.,
School of Aerospace Medicine, Brooks AFB, Tex.
D. E. Torpby, S. D. Leverett, Jr., and L. E. Lamb. Jun 66, 11p SAM-TR-65-293
Availability: Published in Aerospace Medicine v37 n1 p52-8 Jan 1966.

Descriptors: (*Arrhythmia, *Acceleration tolerance), Heart, Acceleration, Electrocardiography, Space medicine.

Forty-two pilots were exposed to +Gx and +Gz acceleration in a variety of profiles and the incidence of arrhythmias investigated. +Gz acceleration did not increase the incidence of arrhythmias. +Gx acceleration increased the incidence of arrhythmias and this increase seemed related to both the degree and duration of acceleration. Premature contractions, with and without aberrant conduction, from both the atria and ventricles were noted. One subject had paroxysmal auricular tachycardia with +Gx acceleration. Possible causal mechanisms are discussed. (Author)
AD-643 682 Not available from CFSTI.

HEART RATE RESPONSE OF ANESTHETIZED AND UNANESTHETIZED DOGS TO NOISE AND NEAR-VACUUM DECOMPRESSION,
School of Aerospace Medicine, Brooks AFB, Tex.
Julian P. Cooke, and Richard W. Bancroft. Jul 66, 10p SAM-TR-65-327
Availability: Published in Aerospace Medicine v37 n7 p704-9 Jul 1966.

Descriptors: (*Cardiovascular system, Decompression), (*Noise, Stress (Physiology)), (*Decompression, Pulse rate), Pressure, Heart, Anesthesia, Neurology, Anoxia, Vacuum, Dogs, Space medicine.

Animal studies indicate that a sudden intense noise, as might accompany an unscheduled loss of cabin pressure, will act as stress sufficient to elicit significant cardiac rate increase in conscious dogs as compared to a lack of an increase in anesthetized animals. Conversely, the heart rates of some anesthetized animals, upon noise exposures, are shown to increase immediately following the cessation of noise before decompression but

not postdecompression, thus, possibly, indicating neurologic factors are involved. Furthermore, postdecompression heart rates of most anesthetized animals were much higher than their predecompression levels, this effect being absent in unanesthetized animals. Audiogenic seizure, previously unreported in dog, occurred in one conscious dog during noise exposure. Stimuli arising from anoxia, evolved body gases, and water vapor are believed to overshadow noise stimuli created in a 1-second decompression (a loudness of about 110 to 112 decibels), followed by an almost complete silence due to the thinness of air at 1mm. Hg absolute. No relationship between mortality and anesthesia or consciousness has been shown to exist, but the magnitude of these observed differences in cardiac rate in response to sound in conscious and anesthetized animals is believed to be significant in decompression studies when response of the cardiovascular system is considered. Responses to noise are here reported to serve as a sensitive indicator or neurologic responses. (Author)
AD-643 886 Not available from CFSTI.

INFLUENCE OF LONG-TERM LOWER BODY NEGATIVE PRESSURE ON THE CIRCULATORY FUNCTION OF MAN DURING PROLONGED BED REST,
School of Aerospace Medicine, Brooks AFB, Tex. Paul M. Stevens, Perry B. Miller, Charles A. Gilber, Theodore N. Lynch, and Robert L. Johnson. Apr 66, 15p SAM-TR-65-314
Availability: Published in Aerospace Medicine v37 n4 p357-67 Apr 66.

Descriptors: (*Weightlessness, Blood circulation), Relaxation (Physiology), Posture, Tolerances (Physiology), Pulse rate, Syncope, Cardiovascular system, Heart, Space medicine.
Identifiers: Bed rest, Orthostasis, Lower body negative pressure.

Exposure to lower body negative pressure for 8 hours a day during a four week period of absolute bed rest has been shown to significantly maintain orthostatic intolerance and plasma volume. A mean plasma volume loss of 332 cc's. was seen in the control subjects while subjects exposed to L.B.N.P. showed no significant change from baseline. Following bed rest, resting recumbent heart rates were significantly higher in control subjects but unchanged in the test subjects; highest orthostatic heart rates although higher in both groups increased significantly less in the test subjects. Following bed rest the incidence of syncope was significantly higher in the control subjects but was unchanged from before bed rest in the test subjects. Hemodynamic cardiovascular measurements suggest that in response to acute sustained L.B.N.P. following bed rest all subjects show a greater increase in heart rate but the cardiac index decreases more in the control subjects. Resting recumbent forearm blood flow is lower following four weeks of bed rest with L.B.N.P. following bed rest alone. The increase in venous tone which occurs following exposure to L.B.N.P. is not apparent following pure bed rest but persists following bed rest with L.B.N.P. Potential mechanisms responsible for these findings and their implications are discussed. (Author)
AD-643 887 Not available from CFSTI.

RESIDUAL PATHOLOGIC CHANGES IN THE CENTRAL NERVOUS SYSTEM OF A DOG FOLLOWING RAPID DECOMPRESSION TO 1 mm. Hg.
School of Aerospace Medicine, Brooks AFB, Tex. Harold W. Casey, Richard W. Bancroft, and Julian P. Cooke. Jul 66, 10p SAM-TR-66-203
Availability: Published in Aerospace Medicine v37 n7 p713-8 Jul 1966.

Descriptors: (*Central nervous system, *Decompression), Pathology, Electrocardiography, Paralysis, Brain, Spinal cord, Anoxia, Sensitivity, Lipids, Dogs, Space medicine.

Following rapid decompression to 1 mm. Hg, with a 120 second exposure, one of seven dogs developed a severe paralytic syndrome. A gradual and steady improvement in the paralysis occurred during a 67 day clinical observation period. Electrocardiogram tracings, obtained during and immediately following decompression, revealed transient alterations that were not associated as a major contributing factor in the pathologic lesions observed in the brain and spinal cord of this animal. The most significant pathologic changes were found in the white portions of the brain and spinal cord. The brain had both focal areas of malacia and a mild diffuse degeneration of myelinated fibers. Minor lesions were observed in the Purkinje cells of the cerebellum and in a paraventricular nuclei of the medulla. Lesions in the spinal cord were confined to the myelinated portions and, although present throughout its length, they were more severe in the anterior cervical and mid-thoracic segments. Based on the appearance and predilection of lesions, degree of vascularity, sensitivity to anoxia and the high lipid content of the white matter in comparison to gray matter, it is suggested that bubble formation of dissolved gases within the myelinated fibers is of major importance in the pathogenesis of the diffuse lesions found in the myelinated portion of the brain and spinal cord. (Author)
AD-643 890 Not available from CFSTI.

A TORQUE MOTOR SERVOROTATOR FOR VESTIBULAR APPLICATION.
Naval Aerospace Medical Inst., Pensacola, Fla.
For primary bibliographic entry see Field 6L.
AD-644 003 HC$3.00 MF$0.65

PHYSIOLOGICAL EXPERIMENTS WITH ANIMALS AND BIOLOGICAL STUDIES DURING GEOPHYSICAL AND ORBITAL FLIGHTS.
Library of Congress, Washington, D. C. Aerospace Technology Div.
16 Sep 66, 20p ATD-66-117
TT-67-60314
Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Space flight, *Animals), Space simulation chambers, Pressure suits, Acceleration tolerance, Rockets, Dogs, Weightlessness, Tolerances (Physiology), Rodents, Monkeys, Space medicine, Electrocardiography, USSR.

Contains articles devoted to high altitude and spaceflight experiments with animals. Includes a number of photographs showing harnesses and other hardware items related to animal space flights.
AD-644 115 HC$3.00 MF$0.65

EVALUATION OF THE PHYSIOLOGICAL PROTECTIVE EFFICIENCY OF A NEW PROTOTYPE DISPOSABLE PASSENGER OXYGEN MASK,
Civil Aeromedical Inst., Oklahoma City, Okla.
For primary bibliographic entry see Field 6Q.
AD-644 118 HC$3.00 MF$0.65

RECENT FINDINGS ON THE IMPAIRMENT OF AIRMANSHIP BY ALCOHOL,
Federal Aviation Agency, Washington, D. C. Office of Aviation Medicine.
For primary bibliographic entry see Field 1B.
AD-644 119 HC$3.00 MF$0.65

AEROSPACE MEDICINE AND BIOLOGY A CONTINUING BIBLIOGRAPHY WITH INDEXES.
National Aeronautics And Space Administration, Washington, D. C.
Oct 66, 232p NASA-SP-7011/29/

Descriptors: *Aerospace medicine, *Bibliography, *Biology, Abstract, Aerospace, Interplanetary, Life, Medicine, Pharmacology, Safety, Sanitation, Space, Support, Survival, Toxicology.

For abstract, see STAR 05 02.
N67-11391 HC$3.00 MF$0.65

ELECTRIC FIELDS AND CALCIUM MOBILITY IN BONE FINAL REPORT.
West Virginia Univ., Morgantown. Biomechanics Lab.
R. Bullard, J. Mc Elhaney, and R. Stalnaker. 21 Sep 66, 81p NASA-CR-79539
Grant NSG-533

Descriptors: *Bone, *Calcium, *Electric field, Chemical, Electric, Femur, Field, Gravity, Hardness, Metabolism, Property, Rat, Specific, Tumor, Weight.

For abstract, see STAR 05 02.
N67-11694 HC$3.00 MF$0.65

STUDIES OF THE EFFECTS OF ACCELERATION ON CARDIOVASCULAR AND RESPIRATORY DYNAMICS SEMIANNUAL STATUS REPORT, APR. 1 - OCT. 1, 1966.
Mayo Clinic, Rochester, Minn.
E. H. Wood. 10 Nov 66, 9p NASA-CR-79912
Grant NSG-327

Descriptors: *Acceleration, *Cardiovascular system, *Data analysis, *Respiratory system, *Time sharing, Analog, Analysis, Cardiovascular, Computer, Data, Dynamics, Measurement, On-line programming, Processing, Respiratory, System, Technique.

For abstract, see STAR 05 02.
N67-11845 HC$3.00 MF$0.65

THE MALAISE OF SPACE-MAN AND ITS POSSIBLE RELATION TO SEROTONIN SEMIANNUAL REPORT, MAY 1 - OCT. 31, 1966.
Florida Southern Coll., Lakeland. Southern Bioresearch Inst.
31 Oct 66, 64p NASA-CR-79928
Contract NGR-10-012-001

Descriptors: *Animal study, *Astronaut performance, *Circulatory system, *High altitude environment, *Serotonin, Air, Altitude, Animal, Astronaut, Blood, Chamber, Circulatory, Concentration, Environment, High, Human, Performance, Serum, Simulation, Study, System.

For abstract, see STAR 05 02.
N67-11858 HC$3.00 MF$0.65

RESPONSES OF HEALTHY SUBJECTS TO STRESSES OF SELECTED ATHLETIC EVENTS FINAL REPORT, JAN. 1963 - JUL. 1964.
Bio-dynamics, Inc., Cambridge, Mass.
19 Jan 65, 115p NASA-CR-65538
Contract NAS9-1246

Descriptors: *Electrocardiogram, *Physiological response, *Stress (biol), Athlete, Biochemistry, Blood, Physiology, Response, Skill, Strength, Telemetry, Urine.

For abstract, see STAR 05 02.
N67-11968 HC$3.00 MF$0.65

AN IMPORTANT CONTRIBUTION TO SPACE MEDICINE - SOME RESULTS OF THE EXPERIMENT ON THE AES " COSMOS-110".
Vazhnyy Vklad V Kosmicheskuyu Meditsinu Consultants And Designers, Inc., Arlington, Va. N. Gurovskiy, A. Kiselev, V. Pravetskiy, and B. Yegorov. 19 May 66, 4p NASA-CR-80181, ST-PR-SM-10489

Contract NAS5-9299
Transl. Into English From Pravda (Moscow), No. 137, 17 May 1966 P 6

Descriptors: *Aerospace medicine, *Cosmos satellite, *Dog, Activity, Aerospace, Blood, Calcium, Cardiovascular, Gastrointestinal, Index, Loss, Medicine, Orbit, Physiology, Satellite, System, Urine, Weight.

For abstract, see STAR 05 02.
N67-12201 HC$3.00 MF$0.65

6T. TOXICOLOGY

REVERSAL OF DECARBORANE-MEDIATED NOREPINEPHRINE DEPLETION BY METHYLENE BLUE,
School of Aerospace Medicine, Brooks ABF, Tex.
For primary bibliographic entry see Field 6O.
AD-643 675 Not available from CFSTI.

FURTHER TOXICOLOGIC STUDIES OF ACUTE HYDRAZINE TOXICITY IN MICE.
Rept. for 1 Jul 65-31 Mar 66.
City of Hope Medical Center, Duarte, Calif. Dept. of Biochemistry.
Eugene Roberts, and Daisy G. Simonsen. Oct 66, 18p
SAM-TR-66-89
Contract AF 41 (609)-2949

Descriptors: (*Hydrazine, Toxicity), Histamine, Secretion, Barbiturates, Sodium compounds, Protection, Acetic acids, Glutamic acid, Glutaric acids, Oxalacetic acid, Dosage, Bromides, Analgesics+antipyretics, Hypnotics+sedatives, Mice.
Identifiers: Imidazoleacetic acid, Arginine.

Toxicologic studies of acute hydrazine toxicity in mice were continued. The results indicate that acute toxicity of hydrazine probably is not mediated through a histamine-release mechanism. Various experiments showed that the type of lethal seizure produced by hydrazine probably has no relationship to the sound-induced seizures in susceptible strains of mice. It was found that sodium phenobarbital had a marked protective effect against hydrazine toxicity when given in subhypnotic amounts. Sodium phenobarbital had an additive protective effect when it was administered together with the previously studied protective mixture (AGKO) containing arginine, glutamate, alpha-ketoglutarate, and oxalacetate. NaBr also was found to be protective and was found to act additively with either sodium phenobarbital or with the AGKO mixture. It was found in the course of the above experiments that imidazoleacetic acid, a substance not protecting mice against acute hydrazine toxicity, had interesting analgesic and hypnotic effects in mice. The quantitative aspects of these effects were worked out, and it is suggested that this agent should be explored further as a possibility for human use. (Author)
AD-644 027 HC$3.00 MF$0.65

ACUTE AND REPEATED INTRAVENOUS ADMINISTRATION OF 1,6-DIMETHYL-1,6-DINITROSO BIUREA TO MALE AND FEMALE RHESUS MONKEYS,
Hazleton Labs., Falls Church, Va.
For primary bibliographic entry see Field 6O.
PB-173 671 HC$3.00 MF$0.65

PRECLINICAL TOXICOLOGIC EVALUATION OF NSC 100844, SARAMYCETIN (X-5079C),
South Shore Analytical and Research Lab., Inc., Islip, N. Y.
For primary bibliographic entry see Field 6O.
PB-173 672 HC$3.00 MF$0.65

7. CHEMISTRY

7A. CHEMICAL ENGINEERING

EXTRACTION OF TUNGSTEN FROM WOLFRAMITE.
India. Dept. Of Atomic Energy, Bombay.
For primary bibliographic entry see Field 18J.
For abstract, see STAR 05 02.
N67-11759 HC$3.00 MF$0.65

CHEMICAL TECHNOLOGY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 31, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 20 24.
ORNL-3945 HC$3.00 MF$0.65

RESULTS OF A PRELIMINARY SURVEY OF CANDIDATE COMMUNITIES FOR SALINE WATER DEMINERALIZATION APPLICATIONS.
Research and development rept.
Black and Veatch, Kansas City, Mo.
Mar 66, 398p
OSW-PR-162
Contract D!-14-01-0001-320

Descriptors: (*Water supplies, Desalination), (*Desalination, Sea water), Water, Sources, Salinity, Purification, Chemical properties, Costs, Feasibility studies, Chemical engineering.

Due to the scarcity of fresh water supplies, the effort to treat or convert saline water to fresh has increased in recent years. The necessity of developing lower cost methods of converting previously unusable saline or brackish waters has become of growing importance. Expanded research and the development of new methods and improved techniques in salt water conversion have lowered costs to a level which may be economically comparable with costs of obtaining additional conventional fresh water supplies in certain areas.
PB-173 673 HC$3.00 MF$0.65

7B. INORGANIC CHEMISTRY

SOLVATION OF EXTRACTED COMPLEX METAL ACIDS. I. THE HFeC14-, HFeBr4-, AND HInBr4-NITROBENZENE SYSTEMS,
North Dakota State Univ., Fargo. Dept. of Chemistry.
Randall L. Erickson, and R. L. McDonald. 4 Dec 65, 8p
AFOSR-66-2264
Grant AF-AFOSR-65-63
Prepared in cooperation with Hawaii Univ., Honolulu, Dept. of Chemistry.
Availability: Published in Journal of the American Chemical Society v88 p2099-2104 May 20 1966.

Descriptors: (*Solvent extraction, *Complex compounds), (*Iron compounds, Solvent extraction), (*Indium compounds, Solvent extraction), (*Nitrobenzenes, Solvent extraction), Inorganic acids, Hydrochloric acid, Bromine compounds, Solvents, Dissociation, Concentration (Chemistry), Electric moments, Ferrates.
Identifiers: Hydrogen tetrabromo ferrate, Hydrogen tetrabromo indate, Hydrogen tetrachloro ferrate.

The effects of nitrobenzene and metal and acid concentrations on the distribution of Fe (III) and In (III) between aqueous HCl or HBr and benzene solutions of nitrobenzene were studied. The amount of water coextracting with the metal species was also determined. It was found that the extracted H9O4 (+).MX4 (-) undergoes extensive ion-pair dissociation, even at relatively low nitrobenzene concentrations; the nitrobenzene solvation numbers for this species are 12 at high nitrobenzene concentrations and 6 at low concentrations. The results also demonstrate the dominant role played by a polar solvent in the ionization process and emphasize the relative unimportance of the bulk dielectric constant on the behavior of ions in the presence of a highly polar substance. (Author)
AD-643 448 Not available from CFSTI.

RELAXATION MECHANISMS IN POLYMERIC SULFUR.
Technical rept.,
California Univ., Los Angeles. Dept. of Chemistry.
A. Eisenberg, and L. A. Teter. Oct 66, 33p TR-14
Contract Nonr-233 (87)
Availability: Published in Journal of the Amer. Chem. Soc. N. P. N. D.

Descriptors: (*Sulfur, Relaxation time), Viscoelasticity, Heat of activation, Chemical bonds, Molecular properties.

The observation is made that polymeric sulfur above the glass transition temperature is subject to two relaxation mechanisms, a 'simple' molecular flow and bond interchange. The effects of these mechanisms on the viscoelastic properties are separated quantitatively, and their relative contributions to the shear viscosity computed. The activation energies of each of the mechanisms are also determined, and it is shown that the molecular flow is subject to a WLF type temperature dependence, while that of the interchange mechanism is of the Arrhenius type. It is tentatively suggested that the chemical relaxation mechanism of a radical nature, with homolytic chain scission predominating. (Author)
AD-643 802 Not available from CFSTI.

THE STATE EQUATIONS OF XENON AND METHANE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. S. Predvoditelev. ?7 Sep 66, 9p FTD-HT-66-454
TT-67-60234
Unedited rough draft trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v7 n1 p93-7 1964.

Descriptors: (*Xenon, Molecular structure), (*Methane, Molecular structure), Interactions, Polarization, Statistical functions, Temperature, Pressure, Density, Compressive properties, Interpolation.

The state equations for xenon and methane are obtained in the temperature range from 0 to 150C and the pressure range from 18 to 150 Amagat units (xenon) and from 15 to 25 Amagat units (methane). The character of the forces of interaction between the molecules is shown.
AD-643 877 HC$3.00 MF$0.65

SYNTHESIS OF SILICON COMPOUNDS.
Technical rept.,
Harvard Univ., Cambridge, Mass. Mallinckrodt Lab.
Eduard Krahe. Jun 66, 73p
ARPA-TR-26
Contract SD-88

Descriptors: (*Silicon compounds, Synthesis (Chemistry)), (*Silanes, Synthesis (Chemistry)), Silicon alloys, Liquid metals, Gold alloys, Eutectics, Chlorine compounds, Chemical reactions, Methanols, Ethers, Organoboranes, Halogenated hydrocarbons.
Identifiers: Methyl chloro silanes.

There is only one binary alloy system of silicon which is liquid below the temperature of decompo-

sition of methyl chloride, alcohol, and ether: the gold-silicon system. The possibility of using a liquid eutectic form of silicon as starting material for the direct synthesis of organosilicon compounds was so inviting, because of the constant exposure of fresh surface to the stream of organic reagent, that experiments were undertaken. It was expected that no gold would be consumed or transported, and so the high price of the gold would represent only capital investment, the cost of which might be overbalanced by operational advantages. The experiments reported here show that methylchlorosilanes (intermediates for making silicone polymers) are indeed produced from methyl chloride and gold-silicon alloy, but that the gold enters into the reaction in such a way as to be transported as fine dust. The chemical change was studied intensively, along with reactions of methanol and ethers. The report concludes with some work on organoboran chlorides. (Author)
AD-643 933 HC$3.00 MF$0.65

THE PAPER ELECTROPHORESIS OF THE IRON (II)-IRON (III) SYSTEM,
Naval Radiological Defense Lab., San Francisco, Calif.
W. E. Lingren, G. Reeck, and R. Marson. 26 Sep 66, 14p USNRDL-TRC-84
Prepared in cooperation with Atomic Energy Commision, Contract AT (49-5)-2084 (2)

Descriptors: (*Iron, *Electrophoresis), Complex compounds, Solutions, Separation, Valence, Sulfuric acid, Sea water, Chemical equilibrium, Microanalysis.

The iron (II) - iron (III) equilibrium mixture in a sulfuric acid solution of pH 2.6 is separable by paper electrophoresis. An attempt was made to determine whether the electrophoretic system affected this equilibrium. Maximum differences of about 10% from the iron (II) - iron (III) true equilibrium ratio were observed after the separation by paper electrophoresis. (Author)
AD-644 002 HC$3.00 MF$0.65

OPTICAL AND LUMINESCENCE PROPERTIES OF MATERIALS UNDER HIGH PRESSURE.
IIT Research Inst., Chicago, Ill. Technology Center.
For primary bibliographic entry see Field 20F.
AD-644 019 Not available from CFSTI.

CHRONOPOTENTIOMETRIC INVESTIGATION OF THE REDUCTION OF CHROMATE IN ALKALINE SOLUTIONS,
California Inst. of Tech., Pasadena. Gates and Crellin Labs. of Chemistry.
Peter James Lingane, Fred C. Anson, and Robert A. Osteryoung. 19 Nov 65, 5p
Availability: Published in Journal of Electroanalytical Chemistry v12 p250-3 1966.

Descriptors: (*Chromates, *Quantitative analysis), Reduction (Chemistry), Electrochemistry, Solutions, Bases (Chemistry), Adsorption, Microanalysis.
Identifiers: Chronopotentiometric analysis.

The chronopotentiometric reduction of chromate on mercury electrodes in sodium carbonate and sodium hydroxide solutions was investigated and no evidence was obtained for electroactive adsorption of any chromate species in amounts greater than about 4 microC/sq. cm. At low current densities, a kinetic wave is observed at -0.5 V in sodium carbonate solutions in the absence of specifically adsorbed anions. Chronopotentiometry can be used to analyze 0.1-2.0 mF chromate solutions with a precision of better than 1%. (Author)
AD-644 058 Not available from CFSTI.

UNSTABLE INTERMEDIATES. PART XXXIV. SOLVATED ELECTRONS: A MODEL FOR THE SPIN-PAIRED SPECIES IN LIQUID AMMONIA,
Leicester Univ. (England). Dept. of Chemistry.
R. Catterall, and M. C. R. Symons. 1966, 7p
AFOSR-66-2814
Grant AF-EOAR-80-64
Availability: Published in Journal of the Chemical Society, Section A, Inorganic, Physical, and Theoretical Chemistry p13-6 1966.

Descriptors: (*Electrons, Solutions), (*Ammonia, Solutions), (*Europium, Solutions), Metals, Ions, Nuclear spins, Theory, Spectroscopy, Electron spin resonance, Nuclear magnetic resonance, Chemical equilibrium, Reaction kinetics, Great Britain.
Identifiers: Metal-ammonia solutions.

It is suggested that of the current models representing the diamagnetic species in metal-ammonia solutions, the (e2 (2-)) solv. or F' model is the most satisfactory. Evidence for this postulate is drawn from a wide range of experimental data including optical studies, electron spin resonance and nuclear magnetic resonance spectroscopy, and from results for solutions of europium in liquid ammonia. (Author)
AD-644 059 Not available from CFSTI.

SYNTHESIS OF OF2 BY ELECTROLYSIS OF WET HF,
American Oil Co., Whiting, Ind. Research and Development Dept.
John A. Donohue, Thomas D. Nevitt, and Alex Zletz. 19 Apr 65, 11p
AROD-4135:14
Contract DA-31-124-ARO (D)-78
Availability: Published in Advances in Chemistry Series n54 p192-201 1966.

Descriptors: (*Oxidizers, Synthesis (Chemistry)), (*Oxygen compounds, Synthesis (Chemistry)), (*Fluorides, Synthesis (Chemistry)), Inorganic acids, Hydrogen compounds, Fluorides, Electrolysis, Electrolytic cells, Gas chromatography, Infrared spectroscopy.
Identifiers: Hydrogen fluoride, Oxygen fluorides.

The electrolysis of wet hydrogen fluoride produces a mixture of oxygen difluoride, ozone, and oxygen at the anode. The effects of electrolysis variables on product yields and anode life were studied at water concentrations from 0.2 to 7.8%. Methods were also developed for analyzing the anode products by gas chromatography and for measuring the water content of the hydrogen fluoride in situ by infrared spectroscopy. Brief, periodic interruptions of the cell current during electrolysis give consistent yields of oxygen difluoride at current efficiencies of at least 45% for several hours. No loss of anode material was detected. Potentially, this direct electrolytic synthesis of oxygen difluoride is less expensive and more efficient than the conventional two-step synthesis in which fluorine produced by electrolysis reacts with aqueous alkali. (Author)
AD-644 083 Not available from CFSTI.

THE EFFECT OF CO-ORDINATION ON THE REACTIVITY OF AROMATIC LIGANDS--VI. COMPETITIVE BROMINATION STUDIES,
Vanderbilt Univ., Nashville, Tenn. Dept. of Chemistry.
J. E. Hix, Jr., and M. M. Jones. 14 Aug 63, 8p
AROD-2659:5
Grant DA-ARO (D)-31-124-G490
See also AD-644 127.
Availability: Published in Journal of Inorganic and Nuclear Chemistry v26 p781-7 1964.

Descriptors: (*Aromatic compounds, *Complex compounds), (*Bromination, Chelate compounds), (*Quinolines, Bromination), Iron compounds, Chromium compounds, Cobalt compounds, Spectra (Infrared), Reaction kinetics, Heat of reaction, Chemical bonds.
Identifiers: Quinolinols.

Competitive bromination of mixtures of 8-hydroxyquinoline and its chelates with iron (III), chromium (III) and cobalt (III) results in preponderant bromination of the metal chelates when insufficient bromine is used. From infra-red analysis of the products it can be estimated that the metal chelates brominate approximately thirty-five times faster than the free ligand. The heats of the bromination reactions in chloroform are very similar for the free ligand and the chromium (III) and cobalt (III) complexes, but that of the free ligand is apparently slightly greater. The reconciliation of diverse reports on the reactions of coordinated aromatic ligands is possible if the literal electron pair donor picture of the coordinate bond is recognized as inadequate for the description of the charge distribution in such bonds in metal complexes. (Author)
AD-644 125 Not available from CFSTI.

THE EFFECT OF CO-ORDINATION ON THE REACTIVITY OF AROMATIC LIGANDS--IX. SOME REACTIONS OF THE OPTICALLY ACTIVE ARSENIC (V)-CATECHOL COMPLEXES.
Revised ed.,
Vanderbilt Univ., Nashville, Tenn. Dept. of Chemistry.
T. H. Larkins, Jr., and M. M. Jones. 17 Jun 63, 5p
AROD-2659:4
Grant DA-ARO (D)-31-124-G490
Revision of manuscript submitted 9 May 63. See also AD-644 125.
Availability: Published in Journal of Inorganic and Nuclear Chemistry v25 p1487-90 1963.

Descriptors: (*Aromatic compounds, *Complex compounds), (*Arsenic compounds, Chelate compounds), (*Phenols, Complex compounds), (*Chelate compounds, *Molecular rotation), Bromination, Organic nitrogen compounds, Chemical reactions, Reaction kinetics, Molecular association.
Identifiers: Pyrocatechols.

A study was made of the bromination and diazocoupling of optically active forms of the complexes of arsenic acid with catechol and 3-methylcatechol. The use of optically active forms provides a test of the lability of the complex under the conditions of the reactions. The retention of optical activity in the products of these reactions indicates that the reactions involve the complex itself, and not some ligand species which is momentarily dissociated. (Author)
AD-644 126 Not available from CFSTI.

THE EFFECT OF COORDINATION ON THE REACTIVITY OF AROMATIC LIGANDS, V. DIAZO COUPLING.
Vanderbilt Univ., Nashville, Tenn. Dept. of Chemistry.
Keith E. Maguire, and Mark M. Jones. 1 Jun 62, 4p
AROD-2659:3
Availability: Published in Journal of the American Chemical Society v85 p154-7 Jan 20 1963.

Descriptors: (*Aromatic compounds, *Complex compounds), (*Organic nitrogen compounds, Complex compounds), (*Zinc compounds, Chelate compounds), Benzenes, Quinolines, Sulfonic acids, Chemical reactions, Reaction kinetics, Substitution reactions, Heat of activation.
Identifiers: Diazobenzene sulfonic acids, Hydroxyquinoline sulfonic acids.

A kinetic study of the coupling reaction of both free and coordinated 8-hydroxyquinoline-5-sulfonic acid with diazotized sulfanilic acid shows the rate to be strongly affected by coordination. The coordination of the phenolate anion to zinc (II) reduces the rate of coupling by a factor of 10,000, but does not change the position at which the electrophilic reagent attacks the ligand. The zinc (II) chelate is much more reactive than the phenol itself, however, by a factor of approximately

1,000,000. The deactivation of the ligand occurs through an enormous decrease in the frequency factor; much of the change must be attributed to the change in the charge on the reactants. The activation energy for substitution on the complex is less than that for the phenolate anion. (Author)
AD-644 127 Not available from CFSTI.

METHODS OF DETERMINING CORIOLIS ZETA CONSTANTS,
National Bureau of Standards, Washington, D. C.
For primary bibliographic entry see Field 7D.
AD-644 130 Not available from CFSTI.

MIXING AND REACTION STUDIES OF HYDRAZINE AND NITROGEN TETROXIDE USING PHOTOGRAPHIC AND SPECTRAL TECHNIQUES.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
M. C. Burrows. 1966, 15p NASA-TM-X-52244
Presented At The 5th Aerospace Sci. Meeting, New York, 23-25 Jan. 1967, Sponsored By Aiaa

Descriptors: *Hydrazine, *Nitrogen oxide, *Propellant chemistry, Atomization, Chemistry, Injection, Intensity, Liquid, Measurement, Mixing, Nitrogen, Oxide, Phase, Photographic, Propellant, Radiation, Reaction, Spectral, Tetroxide.

For abstract, see STAR 05 02.
N67-11331 HC$3.00 MF$0.65

7C. ORGANIC CHEMISTRY

INVESTIGATION OF 1,4-CYCLOHEXANEBIS (METHYLAMINE) AS A REGENERATIVE CARBON DIOXIDE ABSORBENT.
Final rept.,
Naval Research Lab., Washington, D. C.
P. R. Gustafson. 25 Aug 66, 14p NRL-6417

Descriptors: (*Submarines, Environment), (*Carbon dioxide, Absorption), Regeneration, Oxidation, Stability, Boiling point, Amines, Viscosity.
Identifiers: Ethyl amines, Cyclohexanebis (Methylamine).

The alicyclic diamine, 1,4-cyclohexanebis (methylamine), is an efficient regenerative CO2 absorbent. Both the CO2 absorption rate and capacity are equal to that of MEA. The regeneration rate, however, is slightly less. The disadvantages of 1,4-cyclohexanebis (methylamine) as a regenerative CO2 absorbent are formation of a polymeric-type product when saturated with CO2 and an inferior oxidation stability. One advantage of the diamine over MEA is its higher boiling point (ca. 240C compared with 170C). (Author)
AD-643 555 HC$3.00 MF$0.65

SPORIDESMINS. PART IV. ISOLATION AND STRUCTURE OF DEHYDROGLIOTOXIN A METABOLITE PENICILLIUM TERLIKOWSKII,
National Research Council of Canada, Halifax (Nova Scotia). Atlantic Regional Lab.
G. Lowe, A. Taylor, and L. C. Vining. 9 Dec 65, 6p
NRC-9035
Prepared in cooperation with Oxford Univ., (England) Dyson Perrins Lab.
Availability: Published in Journal of the Chemical Society Sec c p1799-1803 1966.

Descriptors: (*Penicillium (Penicillins), Antibiotics), (*Antibiotics, Molecular structure), Absorption spectrum, Biosynthesis, Antimetabolites, Chemical reactions, Nuclear magnetic resonance.
Identifiers: Gliotoxins, Sporidesmins.

Pencillium terlikowskii (HLX 136) produced dehydrogliotoxin, C13H12N2O4S2, when grown on defined media in surface culture. Sulphur, 1,2,3,4-tetrahydro-6-hydroxy-2-methyl-3-methylene-1,4-dioxopyrazino (1,2-a)-indole and the corresponding 1,3,4-trioxo-derivative were obtained when dehydrogliotoxin was treated with anhydrous acid. This reaction is analogous to known reactions in the sporidesmin series and it established both the presence of a 3,6-epidithia-2,5-dioxopiperazine system and the orientation of one hydroxyl group. The second hydroxyl group was shown to be located at position 3a by analysis of the nuclear magnetic resonance spectrum of the antibiotic. (Author)
AD-643 568 Not available from CFSTI.

REACTIONS OF ALKOXY RADICALS. II. THE ABSOLUTE RATE CONSTANT FOR THE COMBINATION OF t-BUTOXY RADICALS,
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
D. J. Carlsson, J. A. Howard, and K. U. Ingold.
27 May 66, 3p
NRC-9238
Availability: Published in Journal of the American Chemical Society v88 p4725-6 Oct 20 1966.

Descriptors: (*Alkanes, Chemical reactions), (*Alkylation, Reaction kinetics), Toluenes, Photolysis, Synthesis (Chemistry), Canada.

A method for the production of t-butoxy radicals by the photolysis of t-butyl hypochlorite was employed to determine the absolute rate of combination of t-butoxy radicals at room temperature and to determine the absolute rate of hydrogen atom abstraction from toluene and diphenylmethane by these radicals. (Author)
AD-643 581 Not available from CFSTI.

A RAPID MICROANALYSIS OF NITROGEN IN ORGANIC COMPOUNDS SLEEVE-TUBE COMBUSTION METHOD,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
C. V. Liu, and P. C. Chow. 20 Sep 66, 10p FTD-TT-65-683
TT-64-31535
Edited trans. of Hua Hsueh Tung Pao (Chinese People's Republic), n3 p58-60 1964.

Descriptors: (*Organic nitrogen compounds, *Microanalysis), (*Nitrogen compounds, Microanalysis), Combustion, Oxidizers, Manganese compounds, Dioxides, Laboratory equipment, Degradation, Materials, China.

The paper describes a technique of using a sleeve-tube combustion in determining nitrogen in organic compounds. The oxidizing agent employed is manganese dioxide. Satisfactory results were obtained on all types of nitrogen-containing organic compounds. The temperature of the fixation furnance was also lower (600-650C) than most rapid methods. This will extend the lifetime of the combustion tube. The method is also very economical, simple and fast. (Author)
AD-643 708 HC$3.00 MF$0.65

THE VIBRATIONAL PROBLEM IN MOLECULES WITH NEARLY FREE INTERNAL ROTATION,
National Research Council of Canada, Ottawa (Ontario). Div of Pure Physics.
For primary bibliographic entry see Field 7D.
AD-643 855 Not available from CFSTI.

THE STATE EQUATIONS OF XENON AND METHANE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7B.
AD-643 877 HC$3.00 MF$0.65

APPLICATIONS OF NUCLEAR MAGNETIC RESONANCE SPECTRA IN THEORETICAL ORGANIC CHEMISTRY RESEARCH,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Chia-lai Pan. 13 Oct 66, 27p FTD-HT-66-423
TT-67-60238
Edited trans. of Hua Hsueh T'ung Pao (Chinese People's Republic) n7 p11-7 1965.

Descriptors: (*Nuclear magnetic resonance, Organic compounds), (*Molecular orbitals, Nuclear magnetic resonance), Spectroscopy, Molecular structure, Magnetic properties, Nuclear spins, Chemical bonds, Valence, Line spectrum, Electrostatics, Quantum statistics, Chemical reactions, Reviews, China.

Topics include: Relationship between molecular structure and magnetism; The study of the nature of bonds by the use of the nuclear magnetic parameters (Determination of ionic character, The influence of hybridization); Nuclear magnetic shielding and effects of radical groups.
AD-643 898 HC$3.00 MF$0.65

SYNTHESIS OF SILICON COMPOUNDS.
Harvard Univ., Cambridge, Mass. Mallinckrodt Lab.
For primary bibliographic entry see Field 7B.
AD-643 933 HC$3.00 MF$0.65

CRYSTAL STRUCTURE OF DIBENZOYLFERROCENE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yu. T. Struchkov. 5 Oct 66, 9p FTD-HT-66-500
TT-67-60280
Unedited rough draft trans. of Akademiya Nauk SSSR. Doklady v110 n1 p67-70 1956.

Descriptors: (*Ferrocenes, Crystal structure), (*Molecular isomerism, Ferrocenes), X-ray diffraction analysis, Crystal lattices, Chemical bonds, Stereochemistry, USSR.
Identifiers: Dibenzoyl ferrocenes.

X-ray studies indicated that crystalline dibenzoyl ferrocene has the benzoyl groups attached to the ferrocenyl nucleus at the 1 and 2' positions.
AD-643 994 HC$3.00 MF$0.65

PECULIARITIES OF BURNING OF ELECTRIC ARC IN PLASMATRONS AND SIMILARITY CRITERIA,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
M. F. Zhukov. 30 Jun 66, 38p FTD-MT-65-532
TT-67-60287
Edited machine trans. of mono. Osobennosti Gorenie Elektricheskoi Dugi v Plazmotronakh i Kriterii Podobiya, Moscow 1965 44p. Presented at the 20th International Congress on Theoretical and Applied Chemistry.

Descriptors: (*Alkynes, Synthesis (Chemistry)), (*Discharge tubes, Plasma generators), Electric arcs, Gas discharges, Electrodes, USSR, Combustion.
Identifiers: Plasmatrons, Acetylenes.

Contents: Shunting of the electric arc, large- and small-scale pulsations; Character of motion of radial sections of arc; Relation between shunting character of erosion of electrodes and volt-ampere characteristic; Polarity of connection of electrodes and peculiarities of arcing connected with this; Criterial generalization of characteristics of plasmatron.
AD-644 033 HC$3.00 MF$0.65

BICYCLO (1.1.1) PENTANE,
Yale Univ., New Haven, Conn. Dept. of Chemistry.

Kenneth B. Wiberg, and Daniel S. Connor. 6 Jun 66, 8p
AROD-3626:12
Contract DA-31-124-ARO (D)-421
Availability: Published in Journal of the American Chemical Society v88 p4437-41 1966.

Descriptors: (*Polycyclic compounds, Chemical properties), (*Cyclopentanes, Chemical properties), Synthesis (Chemistry), Nuclear magnetic resonance, Spectra (Infrared), Mass spectrum, Halogenation, Chemical reactions, Dienes.
Identifiers: Bicyclopentanes, Rearrangement reactions.

The synthesis of bicyclo (1.1.1) pentane and of its 1-methyl derivative is described. The physical properties (nmr, infrared, and mass spectra), the thermal rearrangement to 1,4-pentadiene, and halogenation reactions are reported. (Author)
AD-644 084 Not available from CFSTI.

CONFORMATIONAL EQUILIBRATION AMONG 1,3-DIHALOCYCLOBUTANES,
Yale Univ., New Haven, Conn. Dept. of Chemistry.
Kenneth B. Wiberg, and Gary M. Lampman. 25 May 66, 10p
AROD-3626:15
Contract DA-31-124-ARO (D)-421
Availability: Published in Journal of the American Chemical Society v88 p4429-33 5 Oct 66.

Descriptors: (*Cyclobutanes, Molecular isomerism), (*Molecular isomerism, Chemical equilibrium), Stereochemistry, Halogenated hydrocarbons, Chlorine compounds, Bromine compounds, Iodine compounds, Dipole moments, Molecular structure.
Identifiers: Dibromo cyclobutanes, Dichloro cyclobutanes, Diiodo cyclobutanes, Molecular conformations.

The equilibrium constants for the cis-trans isomerization of 1,3-dichloro-, 1,3-dibromo-, and 1,3-diiodo-cyclobutanes were determined. The dipole moments of the 1,3-dibromocyclobutanes permit an estimation of the geometry of the cyclobutane ring and give results in good accord with the structure of bromocyclobutane determined via the microwave spectrum. The factors responsible for the conformation of the cyclobutane ring and for the observed equilibrium constants are discussed. (Author)
AD-644 085 Not available from CFSTI.

ACETOLYSIS OF BRIDGED CYCLOBUTYLCARBINYL TOSYLATES,
Yale Univ., New Haven, Conn. Dept. of Chemistry.
Kenneth B. Wiberg, and B. Andes Hess, Jr. 4 Jun 66, 8p
AROD-3626:17
Contract DA-31-124-ARO (D)-421
Availability: Published in Journal of the American Chemical Society v88 p4433-6 Oct 1966.

Descriptors: (*Polycyclic compounds, *Stereochemistry), Cyclobutanes, Organic sulfur compounds, Decomposition, Molecular structure, Molecular isomerism, Reaction kinetics, Cyclohexanes.
Identifiers: Acetolysis, Bicycloheptane methyl tosylates, Rearrangement reactions, Bicyclohexane methyl tosylates, Solvolysis.

The anomalously small degree of rearrangement in the acetolysis of endo-bicyclo (2.1.1)hexane-5-methyl tosylate has been investigated. The unrearranged product was shown probably to arise via an SN2 displacement since complete inversion of configuration was found. The SN1 rate for the endo isomer was 0.01 times as great as that for the exo isomer; the difference probably results from a steric effect. The solvolysis of the bicyclo (3.1.1)-heptyl-5-methyl tosylates was also studied. (Author)
AD-644 086 Not available from CFSTI.

MICROWAVE DETERMINATION OF THE CENTRIFUGAL DISTORTION CONSTANTS OF THE METHYL-d3 HALIDES,
Emory Univ., Atlanta, Ga. Dept. of Physics.
For primary bibliographic entry see Field 7D.
AD-644 123 Not available from CFSTI.

THE EFFECT OF CO-ORDINATION ON THE REACTIVITY OF AROMATIC LIGANDS--VI. COMPETITIVE BROMINATION STUDIES,
Vanderbilt Univ., Nashville, Tenn. Dept. of Chemistry.
For primary bibliographic entry see Field 7B.
AD-644 125 Not available from CFSTI.

THE EFFECT OF CO-ORDINATION ON THE REACTIVITY OF AROMATIC LIGANDS--IX. SOME REACTIONS OF THE OPTICALLY ACTIVE ARSENIC (V)-CATECHOL COMPLEXES.
Vanderbilt Univ., Nashville, Tenn. Dept. of Chemistry.
For primary bibliographic entry see Field 7B.
AD-644 126 Not available from CFSTI.

THE EFFECT OF COORDINATION ON THE REACTIVITY OF AROMATIC LIGANDS, V. DIAZO COUPLING.
Vanderbilt Univ., Nashville, Tenn. Dept. of Chemistry.
For primary bibliographi f entry see Field 7B.
AD-644 127 Not available from CFSTI.

PROPERTIES OF NONAQUEOUS ELECTROLYTES FIRST QUARTERLY REPORT, 20 JUN. - 19 SEP. 1966.
Rocketdyne, Canoga Park, Calif.
J. N. Foster, R. Keller, and J. M. Sullivan. 19 Oct 66, 43p NASA-CR-72106, R-6754-1
Contract NAS3-8521

Descriptors: *Electrolyte, *Gas chromatography, *Purification, *Solvent, Acetonitrile, Analysis, Carbonate, Chemical, Chromatography, Dimethyl, Formamide, Gas, Physical, Property, Propylene.

For abstract, see STAR 05 02.
N67-11351 HC$3.00 MF$0.65

METHODS OF FORMATION OF THE NITROSO GROUP AND ITS FORMATIONS.
Illinois Univ., Chicago.
J. H. Boyer. 1966, 154p NASA-CR-79491
Contract NGR-14-012-004

Descriptors: *Chemical reaction, *Formation, *Nitroso compound, Activation, Chemical, Compound, Condensation, Dimerization, Electrolysis, Free, Irradiation, Isomerization, Nitroso, Oxidation, Preparation, Pyrolysis, Radical, Reaction, Reduction, Structure.

For abstract, see STAR 05 02.
N67-11725 HC$3.00 MF$0.65

EVALUATION REPORT ON THE NEPHELOMETRIC METHOD OF NONVOLATILE RESIDUE (NVR) ANALYSIS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A. C. Krupnick, and W. M. Zittle. 19 Sep 66, 31p NASA-TM-X-53520

Descriptors: *Gravimetry, *Instrumental analysis, *Measuring apparatus, *Nephelometer, *Solvent, Accuracy, Analysis, Apparatus, Cleaning, Hydrocarbon, Measuring, Nonvolatile, Operation, Residue, Speed, Statistical, Treatment.

For abstract, see STAR 05 02.
N67-11983 HC$3.00 MF$0.65

SYNTHESIS OF ATACTIC AND STEREOREGULAR VINYLAROMATIC POLYMERS AND A STUDY OF THEIR REACTIONS WITH ALKALI METALS, PART IA SUMMARY REPORT.
Stanford Research Inst., Menlo Park, Calif.
J. Heller, and D. B. Miller. 31 Aug 66, 29p
NASA-CR-80125
Contracts NAS7-100, JPL-951326
Prepared For Jpl

Descriptors: *Aromatic compound, *Synthesis, *Vinyl polymer, Aromatics, Atmosphere, Benzene, Biphenyl, Characterization, Compound, Fractionation, Inert, Lithium, Molecular, Naphthalene, Polymer, Vinyl, Weight.

For abstract, see STAR 05 02.
N67-12176 HC$3.00 MF$0.65

SYNTHESIS OF LINEAR, DOUBLE CHAIN, LADDER POLYMERS FROM SUBSTITUTED TETRAPHOSPHONITRILES QUARTERLY PROGRESS REPORT, JUN. - AUG. 1966.
Grace (W. R.) And Co., Clarksville, Md. Research Div.
B. Grushkin, and R. M. Murch. 21 Sep 66, 14p
NASA-CR-79280
Contract NASW-1415

Descriptors: *Phosphonitrile, *Polymer chemistry, Absorption, Chain, Degradation, Double, Extraction, Fractionation, Ladder, Linear, Molecular, Polymerization, Synthesis, Thermal, Thermogravimetry, Wavelength, Weight.

For abstract, see STAR 05 02.
N67-12222 HC$3.00 MF$0.65

SYNTHESIS OF LINEAR, DOUBLE CHAIN LADDER POLYMERS FROM SUBSTITUTED TETRAPHOSPHONITRILES ANNUAL REPORT, 3 MAY 1965 - 2 MAY 1966.
Grace (W. R.) And Co., Clarksville, Md.
B. Grushkin, and R. M. Murch. 23 Aug 66, 72p
NASA-CR-79273, AR-2
Contract NASW-924

Descriptors: *Phosphonitrile, *Polymer, *Synthesis, Bridge, Double, Isomer, Ladder, Linear, Methyl, Phenyl, Polymerization, Substitution, Thermal.

For abstract, see STAR 05 02.
N67-12261 HC$3.00 MF$0.65

SYNTHESIS OF FERROCENE-NITROGEN-CONTAINING POLYMERS WITH CONJUGATED BONDS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
I. A. Golubeva, Y.A. M.Paushkin, and T. P. Vishnyakova. 19 Oct 66, 16p NASA-TM-X-59134, RSIC-597
Center, 19 Oct. 1966 16 P Refs Transl. Into English From Vysokomol. Soedineniya (Ussr), V. 8, No. 1, 1966 P 181-185

Descriptors: *Conjugated system, *Ferrocene, *Polymer chemistry, Bond, Chemistry, Condensation, Conjugation, Content, Double, Infrared, Nitrogen, Oscillation, Polymer, Spectrum, Synthesis, System, Valence.

For abstract, see STAR 05 02.
N67-12269 HC$3.00 MF$0.65

OIL RECLAMATION USING MOLECULAR SIEVES,
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.

R. Demonbrun, I. G. Speas, and W. E. Weathersby. 29 Sep 66, 60p
Contract W-7405-eng-26

Descriptors: (*Reclamation, Oils), (*Oils, Absorption).

For abstract, see NSA 20 24.
Y-1552 HC$3.00 MF$0.65

7D. PHYSICAL CHEMISTRY

HORNBECK-MOLNAR CROSS SECTIONS FOR THE n=3 STATES OF HELIUM,
Texas Univ., Austin. Dept. of Physics.
M. P. Teter, F. E. Niles, and W. W. Robertson.
8 Nov 65, 7p
AFOSR-66-2334
Grant AF-AFOSR-273-65
Availability: Published in Journal of Chemical Physics v44 n8 p3018-21 Apr 15 1966.

Descriptors: (*Helium, *Ionization), Probability, Atomic energy levels, Quantum mechanics, Light, Molecular properties, Abundance.
Identifiers: Hornbeck-Molnar process.

Analysis of the atomic light originating from energy levels of principal quantum number n=3 in the helium positive column shows that a pressure-dependent loss process exists for states other than the S states. The loss mechanism is identified as the Hornbeck-Molnar process, H*+He to He2 (+)+e (-), by observing the effects of varying the atomic populations when the positive column is irradiated with intense atomic light. Comparison of the pressure-dependent loss rate with the radiation loss rate from a particular state yields the Hornbeck-Molnar cross section. An independent measurement relating the molecular-ion concentration to the 3 (3)D cross section, which agrees quite well with that measured by the previous method. (Author)
AD-643 449 Not available from CFSTI.

THEORY OF ATOM-METAL INTERACTIONS. I. APPLICATION OF QUANTUM-MECHANICAL COLLISION THEORY TO FIELD-IONIZATION PROCESSES.
Interim rept.,
Pennsylvania State Univ., University Park. Dept. of Physics.
D. S. Boudreaux, and P. H. Cutler. 9 Feb 66, 11p
AFOSR-66-2284
Grant AF-AFOSR-213-63
Availability: Published in The Physical Review v149 n1 p170-8 Sep 9 1966.

Descriptors: (*Ionization, Field theory), Atomic energy levels, Quantum mechanics, Chemical reactions, Metals, Probability, Scattering.

The principles of the field-ion microscope were qualitatively well described by one-dimensional models in which the WKB approximation is used to calculate the probability of an atomic electron penetrating the potential barrier into the metal. It was concluded from such models that field ionization cannot occur once the atoms come closer to the tip than a certain critical distance. Recent experiments have shown that the ions are produced in a very narrow region of space just outside the critical distance, this region being called the ionization zone. The one-dimensional calculations give a value for the half-width of this zone which is about twice the experimental value. In the present treatment, the width of the ionization zone and a relative ionization probability were calculated quantum-mechanically in a three-dimensional model. This is done by considering the process of field ionization as a rearrangement-type collision of an atom with a metal surface and applying the formalism of quantum mechanical scattering theory. The calculated results are found to be in better agreement with experiment than previous one-dimensional theories. (Author)
AD-643 469 Not available from CFSTI.

VIBRATIONAL INTENSITIES OF THE FOURTH POSITIVE BANDS IN CARBON MONOXIDE.
Interim rept.,
Mellon Inst., Pittsburgh, Pa.
Ausma Skerbele, Vincent D. Meyer, and Edwin N. Lassettre. 3 Feb 66, 6p
AFOSR-66-2567
Grant AF-AFOSR-61-63
Availability: Published in The Journal of Chemical Physics v44 n11 p4069-72 Jun 1 1966.

Descriptors: (*Electron transitions, *Carbon monoxide), (*Molecular spectroscopy, Carbon monoxide), Vibration, Band spectrum.

The electron-impact spectrum of carbon monoxide has been investigated at electron energies of 400 and 200 V. The intensity distribution among vibrational levels of the fourth positive bands transition has been studied as a function of the scattering angle and electron kinetic energy. The experimental data have been compared with theoretical predictions based on the Born approximation. The results indicate that in the range of the present measurements (theta < 6 degrees) the relative intensities are independent of the scattering angle. This observation agrees with the approximate theory of Craggs and Massey. The relative intensities agree fairly well with the Franck-Condon factors calculated by Nicholls except at high vibrational quantum numbers.
AD-643 470 Not available from CFSTI.

INTENSITY DISTRIBUTION IN THE MOLECULAR NITROGEN FROM THE X SINGLET SIGMA POSITIVE SUB-G TO THE K B SINGLET PI SUB-U STATE,
Mellon Inst., Pittsburgh, Pa.
Vincent D. Meyer, Ausma Skerbele, and Edwin N. Lassettre. 2 Jul 65, 5p
AFOSR-66-1251
Grant AF-AFOSR-61-63
Availability: Published in The Journal of Chemical Physics v43 n10 p3769-71 Nov 15 1965.

Descriptors: (*Electron transitions, *Nitrogen), (*Molecular spectroscopy, Nitrogen), Intensity, Ultraviolet spectroscopy, Inelastic scattering.

The electron impact spectrum of N2 has been studied in the excitation energy range 12.2 to 13.6 electron volts using electrons with initial energy of 200 volts. Resolution is high enough so that vibrational structure is resolved. Although the electron impact spectrum should closely resemble the ultraviolet absorption spectrum (if the Born approximation holds) in both peak position and intensity by morethe two actually differ in relative intensity by more than a factor of twenty. The relative intensities obtained in electron impact are in much better agreement with theory than are the relative intensities obtained by other investigators in the absorption of ultraviolet radiation. This suggests that the ultraviolet spectrum is in error. Reasons for the discrepancy are discussed. (Author)
AD-643 471 Not available from CFSTI.

TEMPERATURE MEASUREMENTS ON ELECTRON AND ION BEAMS,
Hughes Research Labs., Malibu, Calif.
For primary bibliographic entry see Field 20M.
AD-643 532 HC$3.00 MF$0.65

FORCE FIELDS FOR SOME GROUP VI HEXAFLUORIDES.
Interim rept.,
National Bureau of Standards, Washington, D. C.
Stanley Abramowitz, and Ira W. Levin. 9 Nov 65, 6p
AFOSR-66-2166
Prepared in cooperation with National Institutes of Health, Bethesda, Md.
Availability: Published in The Journal of Chemical Physics v44 n9 p3353-6 May 1 1966.

Descriptors: (*Fluorides, *Molecular spectroscopy), Coriolis effect, Infrared spectroscopy, Gases, Molecular rotation, Sulfur compounds, Tellurium compounds.
Identifiers: Tellurium hexafluoride, Sulfur hexafluoride.

The Coriolis Zeta constants were determined for the infrared-active F1u modes of SF6 and TeF6 from gas-phase band contour measurements. The Coriolis data were applied toward determining the general force fields for these Group VI hexafluorides. (Author)
AD-643 570 Not available from CFSTI.

FORCE FIELDS FOR THE BORON TRIHALIDES.
Interim rept.,
National Bureau of Standards, Washington, D. C.
Stanley Abramowitz, and Ira W. Levin. 21 Jul 65, 12p
AFOSR-66-2080
Prepared in cooperation with National Institutes of Health, Bethesda, Md.
Availability: Published in The Journal of Chemical Physics v43 n12 p4213-22 Dec 15 1965.

Descriptors: (*Boron compounds, Halides), (*Molecular spectroscopy, *Halides), Coriolis effect, Infrared spectroscopy, Molecular rotation, Band spectrum.
Identifiers: Boron fluoride, Boron iodide.

The method of Edgell and Moynihan for determining Coriolis zeta constants from the infrared band contours of degenerate vibrational modes was verified for selected molecules and was then applied toward computing the zeta values of the E symmetry vibrations of the boron-trihalide molecules. Since it is not feasible to define unique potential functions for the BX3 species from only frequency data, general force fields were determined for the series by combining both the Coriolis zeta constants and the observed isotopic frequency data in a least-squares refinement scheme. The final force fields indicate that the sensitive stretch-bend interaction constant is a significantly large negative quantity that decreases as the series progresses from BF3 to BI3. (Author)
AD-643 571 Not available from CFSTI.

REACTIONS OF ALKOXY RADICALS. II. THE ABSOLUTE RATE CONSTANT FOR THE COMBINATION OF t-BUTOXY RADICALS,
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
For primary bibliographic entry see Field 7C.
AD-643 581 Not available from CFSTI.

ABSOLUTE RATE CONSTANTS FOR THE COMBINATION OF TRICHLOROMETHYL RADICALS AND FOR THEIR REACTION WITH t-BUTYL HYPOCHLORITE,
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
D. J. Carlsson, J. A. Howard, and K. U. Ingold.
19 Aug 66, 2p
NRC-9240
Availability: Published in Journal of the American Chemical Society v88 n20 p4726 Oct 20 1966.

Descriptors: (*Photochemistry, Reaction kinetics), (*Chloroform, Reaction kinetics), (*Hypochlorites, Reaction kinetics), Alkanes.
AD-643 583 Not available from CFSTI.

ENTROPY IN NONEQUILIBRIUM STATISTICAL MECHANICS.
Aeronautical Research Associates of Princeton, Inc., N. J.
For primary bibliographic entry see Field 20M.
AD-643 586 Not available from CFSTI.

ABSOLUTE VALUE OF THE PROTON g FACTOR,
Harvard Univ., Cambridge, Mass. Dept. of Physics.
Than Myint, Daniel Kleppner, Norman F. Ramsey, and Hugh G. Robinson. 6 Jul 66, 4p
Contract Nonr-1866 (19)
Supported in part by NSF.
Availability: Published in Physical Review Letters v17 n7 p405-7 Aug 15 1966.

Descriptors: (*Protons, Nuclear magnetic moments), Hyperfine structure, Shielding, Hydrogen, Calibration, Nuclear magnetic resonance, Atomic structure, Atomic energy levels.

The quantity measured in this experiment is g sub j (H)/g sub p (H), the ratio of the electron and proton g factors in atomic hydrogen. It can easily be corrected to yield the ratio of the free-space g factors, g sub s/g sub p, and since g sub s is known to high precision, the result in turn leads to a value for g sub p. By comparing this result with previous determinations of g sub j (H)/g sub p (H2O), where g sub p (H2O) is the uncorrected proton g factor as measured in water, the experimental value of the magnetic shielding constant, or chemical shift, for the proton in water is obtained, thus providing for the first time an absolute calibration for nmr spectroscopy. (Author)
AD-643 589 Not available from CFSTI.

THE APPLICATION OF ELECTRON MAGNETIC RESONANCE IN CATALYSIS RESEARCH,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Kwang tse Hsu. 21 Nov 66, 15p FTD-TT-65-1873
TT-67-60188
Edited trans. of Hua Hsueh Shih Chieh (Chinese People's Republic), v18 (sic) n6 p243-5 1964.

Descriptors: (*Nuclear magnetic resonance, *Catalysts), (*Paramagnetic resonance, Catalysts), Nuc ar structure, Catalysis, Absorption spectrum, Free radicals, Complex compounds, Molecular association, Chemisorption, Valence, Radiation damage, China.

The application of electron paramagnetic resonance in catalysis research has principally two aspects: the first one is the shape of the resonance spectrum its structure and the determination of the electronic configuration and the chemical composition of paramagnetic catalysts following the changes introduced by different treatments of the catalyst. The second concerns the determination of the structure and nature of the free radicals produced during a reaction or in an adsorption process and the nature of their bonding with the catalyst from which one can derive the basis and the clues to the reaction mechanism involved. The theory and applications of electron magnetic resonance have been discussed previously. This article deals only with its application in catalysis research. (Author)
AD-643 599 HC$3.00 MF$0.65

A NEW ISODIELECTRIC METHOD FOR MEASUREMENT OF DIPOLE MOMENT IN SOLUTION,
Kent State Univ., Ohio. Dept. of Chemistry.
R. Thomas Myers, and Viola M. L. Sun. 2 Mar 66, 8p
AFOSR-66-2760
Contract AF 49 (638)-641
Availability: Published in Journal of Physical Chemistry v70 n10 p3217-22 Oct 1966.

Descriptors: (*Dipole moments, *Dielectrics), Measurement, Polarization, Solutions, Ethylenes, Carbonates.
Identifiers: Dioxanes.

The compound whose dipole moment is to be measured is dissolved in a solvent such that the dielectric constant does not change on addition of this solute. Application of the Kirkwood-Onsager equation to this process at constant dielectric constant yields an equation connecting the physical properties of the solvent and solution (dielectric constant and densities) with the molar polarization of the solute. The dipole moment of the solute in the solution can then be calculated, using the correlation parameter of the solvent and then the moment calculated for the gas phase by use of the Onsager relation. The solvent consists of mixtures of dioxane and ethylene carbonate, with a dielectric constant variable over a wide range and constant molecular weight. That mixture for which the dielectric constant is constant on adding the solute is determined by interpolation. The method is more accurate and more straightforward than the usual procedure, in which a solvent of low dielectric constant is used, and the data are extrapolated to infinite dilution. Physical properties of the dioxane-ethylene carbonate system are also included (density, dielectric constant, and refractive index). (Author)
AD-643 645 Not available from CFSTI.

REACTION RATES ON PARTIALLY BLOCKED ROTATING DISKS-EFFECT OF CHEMICAL KINETIC LIMITATIONS.
Interim rept.,
AeroChem Research Labs., Inc., Princeton, N. J.
Daniel E. Rosner. 1966, 4p
AFOSR-66-2144
Contract AF 49 (638)-1654
Availability: Published in Journal of the Electrochemical Society v113 n6 p624-5 Jun 1966.

Descriptors: (*Disks, *Reaction kinetics), (*Decomposition, Disks), Rotation, Electrodes, Diffusion, Electrochemistry, Zinc, Copper.

As the active surface of a rotating disk is progressively blocked off the total heterogeneous reaction rate falls in a manner which will depend on the role of diffusion in limiting the rate of reaction in the unblocked case. If f identical with (r sub 0/R) squared is the fractional area blocked then it has been clear that the rate would vary simply as 1-f in the chemically controlled case, and (1-f to the 3/2 power) to the 2/3 power in the diffusion controlled laminar boundary layer case. An exact solution is now provided for the important intermediate case in which both reaction kinetics and diffusion influence the reaction rate for the unblocked disk. For first order heterogeneous (electrode or dissolution) reactions one is led to a linear, singular integral equation of the Volterra type. The solution of this equation provides a general relation between reaction rate and fractional area blockage which can now be used to extract chemical kinetic and diffusional constants, based on relatively straightforward blockage effect measurements. (Author)
AD-643 661 Not available from CFSTI.

SPECIFIC HEAT RATIOS AND ISENTROPIC EXPONENTS FOR CONSTANT-VOLUME COMBUSTION OF STOICHIOMETRIC MIXTURES OF HYDROGEN-OXYGEN DILUTED WITH HELIUM OR HYDROGEN.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
For primary bibliographic entry see Field 21B.
AD-643 670 HC$3.00 MF$0.65

COMPARISON OF LOW-ENERGY ELECTRON DIFFRACTION AND LOW-ANGLE, HIGH-ENERGY ELECTRON DIFFRACTION TECHNIQUES FOR THE OBSERVATION OF CHEMISORPTION.
Technical rept.,
Virginia Univ., Charlottesville. Dept. of Materials Science.
Don F. Mitchell, Gary W. Simmons, and Kenneth R. Lawless. 2 Sep 65, 6p MS-3531-107-66U
Contract Nonr-474 (11)
Availability: Published in Applied Physics Letters v7 n6 p173-5 Sep 15 1965.

Descriptors: (*Electron diffraction analysis, *Chemisorption), Effectiveness, Copper, Oxygen.

It is shown that high energy electron diffraction (HEED) can detect identically the same structures of adsorbed oxygen on copper single crystal surfaces as low energy electron diffraction (LEED). (Author)
AD-643 678 Not available from CFSTI.

SPIN OSCILLATOR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 14B.
AD-643 720 HC$3.00 MF$0.65

EFFECT OF THE DEGREE OF ELONGATION OF POLYMETHYLMETHACRYLATE (PMMA) ON THE MAGNITUDE OF THE SECOND MOMENTS OF A NUCLEAR MAGNETIC RESONANCE SPECTRUM (YAMR),
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. M. Kocharyan, and A. P. Pikalov. 29 Jul 66, 10p FTD-TT-65-2007
TT-67-60253
Unedited rough draft trans. of Akademiya Nauk Armyanskoi SSR, Erevan. Doklady, v40 n1 p25-9 1965.

Descriptors: (*Acrylic resins, *Nuclear magnetic resonance), Spectrum analyzers, Instrumentation, Design, Polymers, Elongation, Magnetic moments, Molecular properties, USSR.

An autodyne NMR spectrometer was designed which incorporates a quartz frequency stabilization system in order to avoid difficulties inherent in systems requiring the working sample to be placed in the resonator coil. The device was used to investigate the increase of the second magnetic moment of poly (methylmethacrylate) with elongation of the sample.
AD-643 729 HC$3.00 MF$0.65

THEORETICAL ANALYSIS OF UNSTEADY HEATING AND DESTRUCTION OF A GLASS PLASTIC IN THE REGION OF THE STAGNATION POINT,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11D.
AD-643 733 HC$3.00 MF$0.65

CATALYSIS ON THIN SINGLE-CRYSTAL COPPER FILMS.
Technical rept.,
Virginia Univ., Charlottesville. Dept. of Materials Science.
T. F. Swank, and K. R. Lawless. 23 Dec 64, 5p MS-3531-106-66U
Contract Nonr-474 (11)
Availability: Published in Journal of Applied Physics v36 n6 p2089-90 Jun 1965.

Descriptors: (*Catalysis, *Metal films), (*Copper, Films), Single crystals, Hydrogen, Oxygen, Catalysts, Crystal growth, Electron microscopy.

Catalytic reaction of hydrogen and oxygen in thin single crystal copper films was studied by transmission electron microscopy. Development of fa-

cets, powdering deposits, and single crystal sheet or plate-like growths were observed. (Author)
AD-643 746 Not available from CFSTI.

MACHINE COMPUTATION OF NUCLEAR MAGNETIC RESONANCE SPECTRA.
Air Force Materials Lab., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 14B.
AD-643 775 HC$3.00 MF$0.65

RELAXATION MECHANISMS IN POLYMERIC SULFUR.
California Univ., Los Angeles. Dept. of Chemistry.
For primary bibliographic entry see Field 7B.
AD-643 802 Not available from CFSTI.

DETERMINATION OF THE DIFFUSION COEFFICIENTS IN ALLOYS WITH SEVERAL PHASES,
Redstone Scientific Information Center, Redstone Arsenal, Ala.
V. T. Borisov, V. M. Golikov, and G. N. Dubinin.
27 Oct 66, 14p RSIC-604
TT-67-60229
Trans. of Akademiya Nauk SSSR. Izvestiya. Metallurgiya i Gornoe Delo, n4 p147-52 1964.

Descriptors: (*Surfaces, Diffusion coating), (*Diffusion coating, Alloys), Thermochemistry, Phase studies, Chromizing, Silicon coatings, Aluminum coatings, Corrosion resistance, Electrical properties, Magnetic properties.

Investigated is the method for determining the diffusion coefficient in cases when a multiphase diffusion layer is formed on the surface zone of a metal. The calculation of the diffusion coefficient is made by using as an example the chromium-saturation of iron in a gas phase. (Author)
AD-643 803 HC$3.00 MF$0.65

ANGLE AND CHANNEL DEPENDENCE OF RESONANCES IN e-He SCATTERING NEAR 60 eV.
Revised ed.,
National Bureau of Standards, Washington, D. C.
J. Arol Simpson, M. G. Menendez, and S. R. Mielczarek. 20 Jun 66, 3p
Availability: Published in The Physical Review v150 n1 p76-8 Oct 7 1966.

Descriptors: (*Electron, Scattering), (*Helium, *Atomic energy levels), Electron bombardment, Excitation, Resonance, Line spectrum, Inelastic scattering, Probability.
Identifiers: Delbruck project.

The He I(-) resonances at 57.1 and 59.2 eV in the electron scattering from He were studied as a function of angle in three inelastic channels corresponding to excitation of the (1s2s)3S, (1s2s)1S, and (1s2p)3P states of He. The line shapes of the resonances are found to vary with angle. The application of the Fano-Cooper formula, developed for the case of photon absorption, to resonances in inelastic electron scattering is discussed, along with a simple procedure for determining the line profile indices. The angular dependence of the 1S, 3S, and 3P excitations at 56.7 eV was also determined out to about 60 degrees. (Author)
AD-643 807 Not available from CFSTI.

SURFACE VISCOSITY OF POLYDIMETHYLSILOXANE MONOLAYERS.
Interim rept.,
Naval Research Lab., Washington, D. C.
N. L. Jarvis. 4 May 66, 11p NRL-6430

Descriptors: (*Foaming inhibitors, Siloxanes), (*Siloxanes, Monomolecular films), (*Monomolecular films, Viscosity), Surface properties, Silicone plastics, Viscosimeters, Molecular association, Surface-active substances, Molecular properties.
Identifiers: Cohesion, Polydimethylsiloxanes, Surface chemistry.

The surface viscosities of a series of polydimethylsiloxanes were studied using a canal viscometer as well as a torsional surface viscometer. The siloxane monolayers investigated had molecular weights ranging from 520 to approximately 105,000 and included both the ethoxy and trimethyl end-blocked polymers. The surface viscosity of even the highest molecular weight polydimethylsiloxane monolayer was extremely low, below the limit of sensitivity of the canal viscometer, which is of the order of 0.0001 surface poise. This surface viscosity is remarkably low when compared with monolayers of other polymeric materials that have been studied at the water/air interface. Many of these polymers such as poly-e-capramide (6-Nylon), the proteins, and synthetic polypeptides have given highly viscous, or viscoelastic, non-Newtonian films even at film pressures of only a few dynes/cm. The low surface viscosity of the siloxanes reflects the relatively low intermolecular cohesion that exists between adjacent siloxane chains in a monolayer. This low surface viscosity may in part explain the defoaming and antifoaming ability of the polydimethylsiloxane fluids. (Author)
AD-643 847 HC$3.00 MF$0.65

THE VIBRATIONAL PROBLEM IN MOLECULES WITH NEARLY FREE INTERNAL ROTATION,
National Research Council of Canada, Ottawa (Ontario). Div of Pure Physics.
J. T. Hougen. 1965, 18p NRC-9119
Availability: Published in Pure and Applied Chemistry v11 p481-95 1965.

Descriptors: (*Molecular spectroscopy, Reviews), (*Alkynes, Molecular properties), Chemical bonds, Vibration, Groups (Mathematics), Molecular energy levels, Microwave spectroscopy, Stereochemistry, Selection rules, Canada.
Identifiers: Crotonylenes.

Consideration is given to some of the recent work on the vibrational problem in molecules with nearly free internal rotation. The paper is divided into two parts. In the first part attention is given to some of the group theoretical ideas currently being applied to the problem. The second part deals with the question of how normal modes can be algebraically described in such a molecule. To make the discussion more specific, the dimethylacetylene molecule is taken as an example. Both parts of the paper are concerned with the differences between the techniques suggested for dealing with dimethylacetylene-like molecules and the techniques employed for 'ordinary' molecules.
AD-643 691 Not available from CFSTI.

THE SOLUTION PROPERTIES OF SOME POLY-(DIMETHYLENE-POLYETHYLENE SUBSTANTS IN MIXED BOND SOLVENTS.
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
For primary bibliographic entry see Field 11B.
AD-643 836 Not available from CFSTI.

SPECTRAL TRANSPARENCY AND MICROSTRUCTURE OF ARTIFICIAL FOG,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. E. Zuev, M. V. Kabanov, B. P. Kashcheev, S. D. Tvorogov, and S. D. Khmelevtsov. 2 Sep 66, 18p FTD-HT-66-396
TT-67-60239
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR), n2 p90-7 1964.

Descriptors: (*Fog, Density), (*Clouds, Microstructure), Liquids, Drops, Meteorological phenomena, Laboratory equipment, Model tests, Spectra (Infrared), Spectra (Visible + ultraviolet), Optical instruments.

This article describes the apparatus, measurement method and results of experimental studies of the microstructure and spectral transparency of artificial fog. It is demonstrated that the data obtained may be used applicably to natural liquid-droplet clouds and fog.
AD-643 900 HC$3.00 MF$0.65

NEW TYPE OF MOLECULAR PERTURBATION TREATMENT,
Wisconsin Univ., Madison. Theoretical Chemical Inst.
Joseph O. Hirschfelder, and Robert Silbey. 8 Apr 66, 6p
Grant NsG-275-62
Prepared in cooperation with Florida Univ., Gainesville. Quantum Theory Project.
Availability: Published in The Journal of Chemical Physics v45 n6 p2188-92 Sep 16 1966.

Descriptors: (*Atomic orbitals, Perturbation theory), (*Molecular orbitals, *Perturbation theory), (*Wave functions, Molecular orbitals), Hydrogen, Groups (Mathematics), Differential equations, Chemical bonds.

A new type of perturbation treatment is developed for molecular problems using a product of atomic or molecular orbitals as the zeroth-order wavefunction. A special feature of this procedure is that all of the quantum states arising from a single electronic configuration are treated simultaneously. The formulas are derived for a general molecular configuration. For the special case of H2 (+) where the 1s atomic orbital leads to both a symmetric and antisymmetric molecular state, the basic equation is Ha=1/2 (Es+Ea)a+1/2 (Es-Ea)b where the exact unnormalized wavefunctions for the symmetric and antisymmetric states are Psi-s=a+b and Psi-a=a-b, respectively. This basic equation is used to generate a set of perturbation equations, the zeroth order being the Schrodinger equation for a separated hydrogen atom. The interaction of three hydrogen atoms in their ground state is also considered as an example. In general, the energy through the first order agrees with the Heitler-London formalism. (Author)
AD-643 916 Not available from CFSTI.

COLLOID JOURNAL VOL. 27 NO. 5: SELECTED ARTICLES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
29 Jul 66, 13p FTD-HT-66-301
TT-67-60276
Unedited rough draft trans. of Kolloidnyi Zhurnal (USSR) v27 n5 p731-4, p785-6 1965.

Descriptors: (*Aerosols, Physical properties), Particle size, Production, Nucleation, Aerosol generators, Fatty acid esters, Particles, Electric fields, Electrostatics, Coagulation, USSR.
Identifiers: Dioctyl sebacates.

Contents: The preparation of reproducible monodisperse aerosols with a mean particle radius from 30 to 3000 A, by A. G. Sutugin. The interaction of charged aerosol particles in a uniform electrical field, by V. I. Nikolenko.
AD-643 929 HC$3.00 MF$0.65

HIGH ENERGY SYSTEM (ORGANIC ELECTROLYTE).
Electric Storage Battery Co., Yardley, Pa. Carl F. Norberg Research Center.
For primary bibliographic entry see Field 10C.
AD-643 935 HC$3.00 MF$0.65

ENERGY SPECTRUM PI-ELECTRONS IN LONG CHAINS OF CONJUGATE BONDS,

Foreign Technology Div., Wright-Patterson AFB, Ohio.
Hao Pai-ling, Liu Te-shen, and Chen Shik-kan.
15 Aug 66, 27p FTD-MT-66-27
TT-67-60278
Edited machine trans. of Chung Kuo K'O Hsueh (Chinese People's Republic) v10 n6 p653-75 1961.

Descriptors: (*Polymers, *Molecular orbitals), (*Chemical bonds, Polymers), Electrons, Molecular energy levels, Distribution, Equations, Nitriles, Alkynes, Acrylonitrile polymers, Matrix algebra, Synthesis (Chemistry), Equations, Polynomials, Semiconductors, China.
Identifiers: Organic semiconductors, Polyphenylacetylenes, Polyphenylenes.

This work is devoted to the LCAO-MO method on infinitely long periodic structures and the electron energy spectra of certain ideal macromolecules with a system of conjugated bonds are studied. Special attention is paid to the close contact of the spectrum with structure and to the wide possibility of chemical synthesis. (Author)
AD-643 961 HC$3.00 MF$0.65

THE EFFECT OF ADSORPTION OF GASES AND VAPORS ON THE WORK FUNCTION OF SEMICONDUCTORS WITH THE STRUCTURE OF ZINC BLENDE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20L.
AD-643 971 HC$3.00 MF$0.65

ON THE APPLICATION OF SHOCK TUBES FOR INVESTIGATION OF CHEMICAL REACTIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. A. Borisov, S. M. Kogarko, and A. V. Lyubimov. 15 Aug 66, 22p FTD-MT-65-257
TT-67-60274
Edited machine trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR), n3 p175-83 1960.

Descriptors: (*Shock tubes, *Chemical reactions), (*Ignition lag, Shock tubes), Shock waves, Reaction kinetics, Reflection, Gas flow, Thermochemistry, Argon, Nitrogen, Oxygen, Alkanes, Detonations, USSR.

An investigation was made of the motion of shock waves in inert (Ar, N2) and reacting gases (97% Ar + 3% (11/12 O2 + 1/12 C7H16) in a shock tube. It is experimentally shown that real flow of nonreacting gas in shock tube strongly differs from that obtained from theory. Experiments with reacting mixtures showed that investigation of kinetics of exothermic reactions in shock tubes is complicated by disturbance of uniformity of flow of gas and deviation of parameters of flow from values calculated theoretically. Delays of ignition of this mixture in region of temperatures 1500-2400K and pressures 1-20 atm are determined. (Author)
AD-643 982 HC$3.00 MF$0.65

THE PAPER ELECTROPHORESIS OF THE IRON (II)-IRON (III) SYSTEM,
Naval Radiological Defense Lab., San Francisco, Calif.
For primary bibliographic entry see Field 7B.
AD-644 002 HC$3.00 MF$0.65

THE THEORY OF INFRARED ABSORPTION IN CRYSTALS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20F.
AD-644 007 HC$3.00 MF$0.65

INTERMOLECULAR REACTION AND DISPLACEMENTS OF OSCILLATION FREQUENCIES OF MOLECULES IN COMBINED DIFFUSION SPECTRAS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20F.
AD-644 010 HC$3.00 MF$0.65

QUANTITATIVE THEORY OF THE TWO-PHOTON IONIZATION OF THE ALKALI ATOMS,
Rochester Univ., N. Y. Inst. of Optics.
H. Barry Bebb. 10 Mar 66, 8p
AROD-5314:5
Supported in part by AFOSR.
Availability: Published in The Physical Review v149 n1 p25-32 Sep 9 1966.

Descriptors: (*Ionization, Theory), (*Alkali metals, Ionization), Atoms, Photons, Atomic energy levels, Atomic properties, Wave functions.

The theory of two-photon ionization of the alkali atoms is developed from the well-known perturbation formula for the second-order transition rate. Quantum defect Coulomb functions are used for both the negative and positive energy states. Spin-orbit splitting of the intermediate p states is taken into account. The results are presented as dispersion curves of the transition rate for photon energies between the two-photon and one-photon thresholds. Cesium is of particular interest because the photon energy for the second harmonic of ruby laser light falls very near the 10p (2)P3/2 level. For a photon energy of 3.57 eV, the transition rate (in cgs units) is found to be 2.6X10 to the minus 49th power X (photon flux) squared. (Author)
AD-644 035 Not available from CFSTI.

INDIRECT METHOD FOR MEASURING SPECTRAL LINEWIDTH, WITH APPLICATION TO N2O,
Technion - Israel Inst. of Tech., Haifa. Dept. of Physics.
U. P. Oppenheim, and A. Goldman. 17 Jun 65, 5p
AFOSR-66-2344
Grant AF-EOAR-84-65
Availability: Published in Journal of the Optical Society of America v56 n5 p675-7 May 1966.

Descriptors: (*Nitrogen oxides, Line spectrum), Spectroscopy, Bandwidth, Israel, Measurement.

When spectral band models are applied to small-frequency intervals within a band, the parameter gamma (zero) may be derived for these intervals. For the case of an Ebasser band the quantity d is equal to the distance between adjacent lines. Since line positions are known for many molecular bands it is possible to derive d and hence gamma (zero), the line width in each interval. It follows that by this method gamma (zero) is derived from low-resolution transmittance measurements. The method is shown to be accurate within plus or minus 20% for the fundamental vibration band of CO and is then applied to the 4.5-micron band of N2O. In part of this band the value of gamma (zero) is found to be 0.008/cm/atm at 300K for nitrogen broadened N2O. (Author)
AD-644 056 Not available from CFSTI.

INTEGRATED INTENSITY OF THE 6.3-MICRON BAND OF WATER VAPOR,
Technion - Israel Inst. of Tech., Haifa. Dept. of Physics.
A. Goldman, and U. P. Oppenheim. 30 Dec 65, 4p
AFOSR-66-2342
Grant AF-EOAR-84-65
Availability: Published in Applied Optics v5 p1073 Jun 1966.

Descriptors: (*Water vapor, *Band spectrum), Intensity, Line spectrum, Chemical bonds, Rotation, Israel.

A curve of growth method was used to measure the integrated intensity of the (1 sub-1)-1 sub 1 rotational line of the NU-2 fundamental band of H2O. All measurements were taken at a temperatational line of the NU-2 fundamental band of H2O. All measurements were taken at a temperature of 523K, with pressures varying between 0.2-5 atm. By neglecting vibration-rotation interaction, the total band intensity was derived for which a value of Sband = 220 plus or minus 22 /sq. cm./atm at NPT was found. (Author)
AD-644 057 Not available from CFSTI.

CHRONOPOTENTIOMETRIC INVESTIGATION OF THE REDUCTION OF CHROMATE IN ALKALINE SOLUTIONS,
California Inst. of Tech.. Pasadena. Gates and Crellin Labs. of Chemistry.
For primary bibliographic entry see Field 7B.
AD-644 058 Not available from CFSTI.

UNSTABLE INTERMEDIATES. PART XXXIV. SOLVATED ELECTRONS: A MODEL FOR THE SPIN-PAIRED SPECIES IN LIQUID AMMONIA,
Leicester Univ. (England). Dept. of Chemistry.
For primary bibliographic entry see Field 7B.
AD-644 059 Not available from CFSTI.

COLLISIONS OF SLOW ELECTRONS WITH ATOMS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20I.
AD-644 072 HC$3.00 MF$0.65

THEORETICAL METHODS OF INVESTIGATION OF FREEZING OF CHEMICAL AND ELECTRONIC PROCESSES IN LOW-TEMPERATURE PLASMA JETS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20I.
AD-644 073 HC$3.00 MF$0.65

INFLUENCE OF KINETICS OF ELEMENTARY PROCESSES ON IONIZATION OF LOW-TEMPERATURE PLASMA JETS WITH VARIOUS LAWS OF DISTRIBUTION OF PARAMETERS IN THE JETS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20I.
AD-644 074 HC$3.00 MF$0.65

TABLE OF THERMODYNAMIC PROPERTIES AND CHEMICAL COMPOSITION OF ARGON IN CHEMICAL EQUILIBRIUM INCLUDING SECOND VIRIAL CORRECTIONS FROM 2400K TO 35,000K,
National Bureau of Standards, Washington, D. C. Joseph Hilsenrath, Carla G. Messina, and Max Klein. Dec 66, 127p
AEDC-TR-66-248
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tullahoma, Tenn.

Descriptors: (*Argon, Thermal properties), Chemical equilibrium, Thermodynamics, Equations of state, Tables, Dissociation, Gas ionization, Density, Compressive properties, Enthalpy, Entropy.

Tables for the thermodynamic properties for argon are presented which take into account the effect of dissociation and ionization and the limiting-law Debye-Huckel and second virial corrections upon the thermodynamic properties and the equilibrium compositions. Values are tabulated from 2400K in steps of 200K to 20,000K and from 20,000K in steps of 500K to 35,000K at conformation spacing in the 'log density/density at standard conditions' values. From 0.00001 to 10 to the 2-4th power x normal density the equilibrium composi-

tion is computed for six species: A, A (+), A (++), A (+++), A (++++), and E (-). The values tabulated include the compressibility factor Z = P x V/RT; the dimensionless functions for internal energy, E/RT; enthalpy, H/RT; entropy, S/R; log10 P (atm); and Z* = Sigma (Ci). The underlying equations and the input data are discussed briefly. The effects of the real-gas corrections on the equilibrium properties are illustrated graphically. The equilibrium composition is given for selected temperatures over the tabulated density range. The wide range of temperatures and densities over which the thermodynamic properties were tabulated make the tables useful in a variety of engineering design and test programs, and in scientific research and development. (Author)
AD-644 091 HC $3.00 MF $0.65

FORCE FIELDS FOR CHCLF2 (F-12) TETRAFLUOROETHANE AND CHCLF2 (F-22) TRIFLUOROMETHANE,
National Bureau of Standards, Washington, D. C.
Ira W. Levin, and Stanley Abramowitz. 11 Oct 65, 8p
AFOSR-66-2167
Availability: Published in Journal of Chemical Physics v44 n7 p2562-7 Apr 1 1966.

Descriptors: (*Fluorides, *Bond spectrum), (*Infrared spectroscopy, Fluorides), Silicon compounds, Germanium compounds, Nitrogen compounds, Phosphorus compounds, Arsenic compounds, Chemical bonds, Rotation, Coriolis effect, Force (Mechanics), Distortion.
Identifiers: Coriolis constant, Aluminum fluoride, Germanium tetrafluoride, Nitrogen trifluoride, Phosphorus trifluoride, Silicon fluorides.

The Coriolis zeta constants of the degenerate modes of SiF_4, GeF_4, NF_3, PF_3, and AsF_3 were obtained from infrared-band contour measurements. These Coriolis coupling data provided the necessary constraints for determining unique force fields for the F2 and E symmetry species of the XF_4 and XF_3 molecules, respectively. In an attempt to limit the force field for the A1 species of the XF_3 molecules the rotational distortion constants, which are functions of both the A1 and E species force constants, were calculated for a range of values of the F12 interaction force constant. For the purpose of this calculation, the E species force constants that were determined from Coriolis coupling data were held fixed. For NF_3, a satisfactory value of F12 was obtained using the rotational distortion data. However, the rotational distortion data were not useful in fixing the A1 species force fields for PF_3 and AsF_3. (Author)
AD-644 062 Not available from CFSTI.

ULTRASONIC AND HYPERSONIC STUDIES OF VIBRATIONAL RELAXATION IN BENZENE,
John Carroll Univ., Cleveland, Ohio. Dept. of Physics.
For primary bibliographic entry see Field 20A.
AD-644 087 Not available from CFSTI.

MICROWAVE DETERMINATION OF THE CENTRIFUGAL DISTORTION CONSTANTS OF THE METHYL-d3 HALIDES,
Emory Univ., Atlanta, Ga. Dept. of Physics.
Allen K. Garrison, James W. Simmons, and Chester Alexander. 7 Mar 66, 6p
AROD-2812:3
Grant DA-ARO (D)-31-124-G336
Availability: Published in The Journal of Chemical Physics v45 n2 p413-5 Jul 15 1966.

Descriptors: (*Halogenated hydrocarbons, *Microwave spectroscopy), Chemical bonds, Rotation, Band spectrum, Deuterated compounds, Chlorine compounds, Bromine compounds, Iodine compounds, Distortion.
Identifiers: Methyl bromide, Methyl chloride, Methyl iodide.

Measurements of pure rotational transitions ranging from J = 0 - 1 up to J = 8 - 9 were carried out for the series of deuterated methyl halides listed below in a frequency range from 12 to 152 GHz. Resulting values of the rotational and centrifugal distortion constants B0, DJJ, and DJK, respectively, are: for CD3 (35)Cl, 10 841.91 MHz, 10.84 kHz, and 102.7 kHz; for CD3 (37)Cl, 10 658.47 MHz, 10.56 kHz, and 99.46 kHz; for CD3 (79)Br, 7714.63 MHz, 5.83 kHz, and 63.56 kHz; for CD3 (81)Br, 7681.23 MHz, 5.86 kHz, and 63.27 kHz; for CD3 (127)I, 6040.31 MHz, 3.59 kHz, and 48.32 kHz. The quadrupole coupling constant eqQ for the halide nucleus in each of these molecules is, respectively, -74.6, -58.8, 575.7, 480.9, and -1929 MHz. Comparison of the above centrifugal distortion constants with those calculated from known force constants is made. (Author)
AD-644 123 Not available from CFSTI.

A TORSION EFFUSION STUDY OF THE REACTION OF GRAPHITE WITH RHENIUM AND URANIUM DIOXIDES,
Washington Univ., Seattle. Dept. of Chemistry.
For primary bibliographic entry see Field 7E.
AD-644 124 Not available from CFSTI.

METHODS OF DETERMINING CORIOLIS ZETA CONSTANTS,
National Bureau Of Standards, Washington, D. C.
Stanley Abramowitz, and I. W. Levin. 15 Feb 66, 6p
AFOSR-66-2160
Prepared in cooperation with NIH, Bethesda, Md. National Inst. of Arthritis and Metabolic Diseases.
Availability: Published in Journal of Molecular Spectroscopy v19 n4 p449-52 Apr 1966.

Descriptors: (*Fluorides, *Bond spectrum), (*Infrared spectroscopy, Fluorides), Boron compounds, Polyatomic molecules, Chemical bonds, Rotation, Coriolis effect.
Identifiers: Boron fluoride, Coriolis constant.

The recently observed high resolution spectrum of the ν_3/ν_4 fundamental of BF_3 was interpreted to yield a Coriolis zeta constant in agreement with that found from an investigation of the unresolved band contour. (Author)
AD-644 150 Not available from CFSTI.

PARAMAGNETIC RESONANCE OF RARE EARTH IONS IN CERIUM OXIDE,
Hebrew Univ., Jerusalem (Israel). Dept. of Physics.
For primary bibliographic entry see Field 20E.
AD-644 133 Not available from CFSTI.

THERMAL ACCOMMODATION COEFFICIENTS FROM HETEROGENEOUS VAPOR-SOLID NUCLEATION DATA,
Battelle Memorial Inst., Columbus, Ohio.
R. D. Gretz. 11 Jul 66, 6p
AROD-5958:4
Grant DA-ARO (D)-31-124-G624
Availability: Published in Surface Science v5 p261-2 1966.

Descriptors: (*Nucleation, *Thermal properties), Vapors, Solids, Data, Vapor pressure.
Identifiers: Thermal accommodation coefficients.

A means of calculating thermal accommodation coefficients from nucleation data, specifically from the apparent critical supersaturation required to initiate nucleation, is reported. The present method of obtaining thermal accommodation coefficients from heterogeneous vapor-solid nucleation data is independent of the detailed nucleation rate equation that may be applicable to the particular system. (Author)
AD-644 139 Not available from CFSTI.

THE LINE-TENSION EFFECT IN HETEROGENEOUS NUCLEATION,
Battelle Memorial Inst., Columbus, Ohio.
R. D. Gretz. 28 Mar 66, 16p
AROD-5058:3
Grant DA-ARO (D)-31-124-G624
Availability: Published in Surface Science v5 p239-51 1966.

Descriptors: (*Nucleation, Dynamics), Free energy, Theory, Crystals, Equations, Vapors.
Identifiers: Line-tension effect.

The theory of heterogeneous vapor-solid nucleation is reformulated to include the line-tension contribution to the free energy of formation of a nucleus. The nucleation theory used is based on the Pound description which employs a cap-shaped model of the critical nucleus. The line-tension effect has been shown to increase the contact angle for small crystals above that of the macroscopic contact angle that would obtain between the phases considered. The role of the contact angle in achieving solutions to the nucleation rate equation is considered in detail. It is shown that in the absence of line-tension there exists one and only one physically real contact angle that satisfies the nucleation equation. However, the nucleation rate equation becomes multivalued in respect to its dependence on contact angle if the line-tension effect is considered. A general method is derived for plotting nucleation data in which three nucleation effects may be readily distinguished: (1) a mechanism involving direct addition of atoms from the vapor to the critical nucleus, (2) a mechanism involving addition of atoms to the critical nucleus via surface diffusion on the substrate, and (3) the occurrence of the line-tension effect in heterogeneous nucleation. These predictions are compared with data available in the literature. The Zeldovich factor which depends very strongly on contact angle for values less than 60 degrees is found to not affect the conclusions. (Author)
AD-644 140 Not available from CFSTI.

STUDYING THE OXIDATION OF NiAl - NiPd ALLOY SYSTEMS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11F.
AD-644 166 HC $3.00 MF $0.65

OPTICAL FUNCTIONS FOR MOLECULAR HYDROGEN FINAL REPORT.
Avco Corp., Lowell, Mass. Avco Missiles, Space And Electronics Group.
R. J. Spindler, Jr. 30 Sep 66, 174p NASA-CR-72107, AVSSD-0287-66-RR
Contract NAS3-7990

Descriptors: *Energy band, *Franck-condon factor, *Hydrogen, *Molecular gas, *Vibrational spectrum, Band, Calculation, Curve, Electronic, Energy, Factor, Function, Gas, Level, Molecular, Optical, Potential, Spectrum, State, System, Transition, Vibration, Wave.

For abstract, see STAR 05 02.
N67-11982 HC $3.00 MF $0.65

INTERDISCIPLINARY MATERIALS RESEARCH INCLUDING FUNDAMENTAL PHYSICS AND CHEMISTRY OF MATERIALS, ENVIRONMENTAL EFFECTS AND RELATED PROBLEMS SEMIANNUAL PROGRESS REPORT, MAR. 1 - AUG. 31, 1966.
Rensselaer Polytechnic Inst., Troy, N. Y.
S. S. Sternstein. Sep 66, 19p NASA-CR-79755
Grant NSG-100-60

Descriptors: *Materials science, *Research project, Alloy, Chemistry, Deformation, Electron,

Environment, Glass, Magnetic, Material, Metal, Nuclear, Physics, Polymer, Project, Pyrolysis, Research, Resonance, Scattering, Science, Spectroscopy, Spin, Testing, Thermodynamics, Ultrasonics, X-ray.

For abstract, see STAR 05 02.
N67-12074 HC$3.00 MF$0.65

THE REACTIONS PERTAINING TO ZINC-SILVER AND CADMIUM-SILVER BATTERIES QUARTERLY REPORT.
Idaho State Univ., Pocatello. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Dept. Of Chemistry.
G. M. Arcand. 15 Aug 66. 21p NASA-CR-80139, QR-2
Contracts NAS7-100, JPL-951458
Prepared For Jpl

Descriptors: *Chemical reaction, *Zinc-silver oxide battery, Anode, Battery, Cadmium, Cadmium-silver battery, Cathode, Chemical, Decomposition, Deposition, Measurement, Oxide, Reactant, Silver, Thermal, Zinc.

For abstract, see STAR 05 02.
N67-12163 HC$3.00 MF$0.65

ELECTROCHEMICAL DATA, PART IV QUARTERLY REPORT, JUL. 1 - SEP. 30, 1966.
National Bureau of Standards, Washington, D. C.
H. J. De Wane, and W. J. Hamer. 12 Oct 66. 7p
NASA-CR-79513, NBS-9432
NASA ORDER R-09-022-029

Descriptors: *Electric conductivity, *Electrolysis, *Hydrochloric acid, Acid, Concentration, Conductance, Conductivity, Constant, Electric, Equivalence, Hydrochloric, Literature, Molecule, Survey, Temperature, Value.

For abstract, see STAR 05 02.
N67-12213 HC$3.00 MF$0.65

DETERMINATION OF FREE, COMBINED, AND ADSORBED CARBON IN BERYLLIUM.
Union Carbide Corp., Ridge, Tenn. Y-12 Plant.
F. W. Postma, Jr., and G. E. Walden. 14 Oct 66. 16p
Contract W-7405-eng-26

Descriptors: (*Carbon, Adsorption), (*Beryllium, Chemical analysis).

For abstract, see NSA 20 24.
Y-1556 HC$3.00 MF$0.65

7E. RADIO AND RADIATION CHEMISTRY

F-CENTER FORMATION BY FUNDAMENTAL ABSORPTION IN KI.
Cornell Univ., Ithaca, N. Y. Materials Science Center.
For primary bibliographic entry see Field 20B.
AD-643 486 HC$3.00 MF$0.65

ENERGY DEPENDENCE OF FREE RADICAL PRODUCTION IN ALANINE,
School of Aerospace Medicine, Brooks AFB, Tex.
P. J. Ebert, K. A. Hardy, and D. G. Cadena. 30 Nov 64. 24p SAM-TR-66-225
Prepared in cooperation with Southwest Research Inst., San Antonio, Tex. Dept. of Physics.
Availability: Published in Radiation Research v26 n2 p178-96 Oct 65.

Descriptors: (*Dosimeters, Amino acids), (*Amino acids, *Free radicals), Radiation chemistry, Gamma counters, X rays, Scintillation counters, Sensitivity, Photons, Energy, Electron spin resonance.
Identifiers: Alanines.

The amino acid dl-alanine can be used as an accurate dosimeter, sensitive to directly and indirectly ionizing radiation. The resolvable energy response for charged particles parallels that of an organic scintillator, and the energy response to gamma-rays and X-rays is flat from below 40 kev to 1.25 Mev, the highest photon energy used. Conditions of high vacuum show no decrement in radiation-induced signal. The average atomic number and atomic percentages of alanine are nearly equal to those to tissue, indicative that such a system would minimally perturb a radiation field in the measurement of a radiation dose. (Author)
AD-643 884 Not available from CFSTI.

LIGHT SENSITIVITY OF POLYVINYLCINNAMATE AND ITS NITRODERIVATIVES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. P. Belyakova, Yu. S. Bokov, V. P. Lavrishchev, P. G. Konovalov, and D. N. Vaskevich. 14 Jul 66. 9p FTD-HT-66-145
TT-67-60300
Unedited rough draft trans. of Vysokomolekulyarnye Soedineniya (USSR) v7 n9 p1637-40 1965.

Descriptors: (*Polymers, *Photosensitivity), (*Photographic chemicals, Polymers), (*Organic nitrogen compounds, Photosensitivity), Ultraviolet radiation, Photochemistry, Solubility, Thermal properties, Mechanical properties, Spectra (Infrared), Spectra (Visible + ultraviolet), Vinyl plastics. USSR.
Identifiers: Polyvinyl cinnamates, Polyvinyl nitrocinnamates.

Polyvinylcinnamate and its o -, m - and p - nitroderivatives were synthesized and investigated with respect to their behavior towards ultraviolet light. The solubility, thermomechanical properties and infrared and ultraviolet spectra of the compounds were studied. They are capable of photochemical structuration on irradiation with ultraviolet light, forming the following series with respect to photosensitivity: polyvinylcinnamate <polyvinyl-o-NO2 - cinnamate < polyvinyl - m - NO2 - cinnamate < polyvinyl-p-NO2-cinnamate. (Author)
AD-644 044 HC$3.00 MF$0.65

A TORSION EFFUSION STUDY OF THE REACTION OF GRAPHITE WITH HAFNIUM AND URANIUM DIOXIDES.
Washington Univ., Seattle. Dept. of Chemistry.
T. C. M. Pilloy, and N. W. Gregory. 11 Apr 66. 9p
AROD-2441:17
Grant DA-ARO (D)-31-124-G461
Availability: Published in Journal of Physical Chemistry v70 n10 p3140-5 Oct 1966.

Descriptors: (*Uranium compounds, Chemical reactions), (*Hafnium compounds, Chemical reactions), (*Graphite, Chemical reactions), (*Carbon monoxide, Vapor pressure), Dioxides, Carbides, Chemical equilibrium, Thermodynamics, Torsion.
Identifiers: Hafnium oxide, Uranous oxide.

Steady-state CO pressures above mixtures of graphite with UO2 and with HfO2, respectively, in effusion cells were measured in the vicinity of 1600K. An equilibrium-like behavior is observed, but the associated thermodynamic constants indicate that the controlling reactions are not those involving actual equilibration of graphite and the starting oxides. Various possible reactions which might be expected to give rise to equilibrium CO pressures of the magnitude are discussed. (Author)
AD-644 124 Not available from CFSTI.

PRODUCTION OF 204 TL FROM THALLIUM OXIDE,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
Wilmer R. Cornman. Jun 66. 10p
Contract AT (07-2)-1

Descriptors: (*Thallium compounds, Oxides), (*Thallium, Radioactive isotopes).

For abstract, see NSA 20 24.
DP-1033 HC$3.00 MF$0.65

LITERATURE SURVEY OF RADIOCHEMICAL CROSS-SECTION DATA BELOW 425 ME V.
Oak Ridge National Lab., Tenn.
H. W. Bertini, B. L. Bishop, M. P. Guthrie, and E. H. Pickell. Oct 66. 59p NASA-CR-79100, ORNL-3884
Contract NASA ORDER R-104/1/, W-7405-ENG-26

Descriptors: *High energy interaction, *Nuclear particle, *Scattering cross section, Cascade, Cross, Element, Energy, Evaporation, Heavy, High, Interaction, Literature, Lithium, Model, Nuclear, Particle, Prediction, Radiochemistry, Reaction, Section, Survey, Table.

For abstract, see STAR 05 02.
N67-12214 HC$3.00 MF$0.65

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. BIOLOGICAL OCEANOGRAPHY

RECENT ALGAL STROMATOLITES FROM THE CANARY ISLANDS.
Rhode Island Univ., Kingston. Narragansett Marine Lab.
For primary bibliographic entry see Field 8G.
AD-643 588 Not available from CFSTI.

DIATOMS AND THE ECOLOGICAL CONDITIONS OF THEIR GROWTH IN SEA ICE IN THE ARCTIC OCEAN.
Technical rept.,
Arctic Inst. of North America, Washington, D. C.
Hiroshi Meguro, Kuniyuki Ito, and Hiroshi Fukushima. Mar 66. 4p
Contract Nonr-3996 (01)
Prepared in cooperation with Tohoku Univ., Sendai, Japan, Kyoto Univ., Japan, and Municipal Univ., Yokohama, Japan.
Availability: Published in Science v152 n3725 p1089-90 May 20 1966.

Descriptors: (*Plankton, Sea ice), Chlorophylls, Sea water, Arctic Ocean, Periodic variations, Ecology, Growth.

A summer field survey off Point Barrow, Alaska, revealed that Arctic sea ice develops a growth of phytoplanktonic diatoms. The diatoms are found in a brine solution in microfissures between ice crystals on the underside of the ice. The chlorophyll content of this layer is 100 times more than that of the surrounding sea waters; this has led to a hypothesis that a considerable fraction of the primary production of the Arctic Sea may be carried out in sea ice, especially during the spring and early summer months. (Author)
AD-643 785 Not available from CFSTI.

8B. CARTOGRAPHY

DEVELOPMENT OF A VARISCALE STEREO POINT MARKING INSTRUMENT.

Group 8B—Cartography

Final technical rept. Apr 64-Jun 66,
Bausch and Lomb, Inc., Rochester, N. Y.
Ronald J. Martino. Sep 66, 80p
Contract DA-44-009-AMC-522 (X)

Descriptors: (*Stereoscopic map plotters, Aerial photographs), Identification, Images, Photogrammetry.

The report covers the design, manufacture and test of two prototype Variscale Stereo Point Marking Instruments. The purpose of these instruments was to provide for the identification and marking of conjugate image points on two aerial photographs, where the photographs may have large differences in format size and scale.
AD-643 722 HC$3.00 MF$0.65

8C. DYNAMIC OCEANOGRAPHY

CORRELATION OF SOME LABORATORY EXPERIMENTS IN TWO-PHASE FLOW WITH PHENOMENA AT THE AIR-SEA INTERFACE,
Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
Alfred C. Pinchak. Aug 66, 46p ARL-66-0159

Descriptors: (*Ocean waves, Atmospheric motion), (*Two-phase flow, *Atmospheric motion), Marine meteorology, Shear stresses, Ocean currents, Turbulent boundary layer, Surfaces, Drops, Velocity.
Identifiers: Entrainment.

Results of laboratory experiments dealing with wave formation and droplet entrainment in two-phase flow systems are presented here. Data concerning the effective interfacial shear stress between the gas and liquid are given and compared with similar air-sea data. By means of an extrapolation technique, the critical velocity for droplet entrainment in laboratory experiments is related to the corresponding critical velocity in the air-sea case. Analysis of a simplified model of the entrainment process indicates a reduction in the effective interfacial shear stress with increasing entrainment. However, the stress reduction is less than in direct proportion to the amount of entrainment. (Author)
AD-643 767 HC$3.00 MF$0.65

EFFECTS OF PARTICLE SIZE AND WAVE STATE ON GRAIN DISPERSION.
Technical rept.,
Chicago Univ., Ill. Fluid Dynamics and Sediment Transport Lab.
Stephen Patrick Murray. Jun 66, 87p TR-7
Contract Nonr-2121 (26)
Doctoral thesis.

Descriptors: (*Beaches, Erosion), (*Sand, Mass transfer), (*Ocean waves, Mass transfer), (*Sedimentation, Tracer studies), Diffusion, Particle size, Ocean currents, Ocean bottom, Hydrodynamics, Shallow water.

The dispersion of three sizes of tagged grains normal to the shoreline by shoaling wind waves was studied in Buzzards Bay, Massachusetts. Experiments were restricted to periods during which wave crests approached parallel to the shoreline. Determination of the fmquency of tagged grains in samples taken from the bottom lead to the construction of concentration maps. Analysis of the concentration maps yielded a value of an index of net movement for each grain size in each experiment. The maximum horizontal velocity under the wave crest near the bottom was computed from measurements of wave geometry and water depth. Within the experimental range of the data it is concluded that under the same wave conditions, finer grain sizes have a greater tendency to move offshore than coarser grains. A change in wave state resulting in an increase in the maximum horizontal velocity near the bottom produces an increase in the tendency for all test grain sizes to move seaward. Theoretical concentrations computed from the equations of turbulent diffusion of contaminant particles in the atmosphere agree qualitatively with the empirical observations of this study and help to explain them. (Author)
AD-643 824 HC$3.00 MF$0.65

A TWO-LAYER MODEL OF THE GULF STREAM.
Final rept.,
Michigan Univ., Ann Arbor. Dept. of Meteorology and Oceanography.
Stanley J. Jacobs. Sep 66, 42p Rept. no. 07344-1-F
Contract Nonr-1224 (55)

Descriptors: (*Gulf Stream, Mathematical models), Ocean bottom topography, Boundary layer, Beaches, Flow fields.

A theory is developed for a two-layer inertial model of the Gulf Stream. Both layers are in motion, but it is assumed that the ratio of the geostrophic drift in the lower layer to that of the upper layer is small. Approximate analytical solutions are obtained under this assumption. In addition, a criterion for the existence of inertial boundary currents is established. An important result is the prediction of deep and surface countercurrents to the east of the high velocity part of the Stream. These are due to the effect of bottom topography. Another important result is that the interface at the coast comes to the surface at a lower latitude if the deep water is in motion, and that the intersection of the interface and the sea surface extends out to sea in a northeasterly direction from the coast. The theory of the flow near the line of zero upper layer depth is as yet incomplete. (Author)
AD-643 826 HC$3.00 MF$0.65

LATERAL BOUNDARY MIXING IN A SIMPLE MODEL OF OCEAN CONVECTION.
Interim rept.,
Stanford Univ., Calif. Dept. of Physics.
L. I. Schiff. 31 Jan 65, 9p
AFOSR-66-2346
Contract AF 49(638)-1389
Availability: Published in Deep Sea Research v13 p621-6 1966.

Descriptors: (*Ocean currents, *Convection (Heat transfer)), (*Sea water, Convection (Heat transfer)), Boundary layer, Fluid flow, Partial differential equations, Temperature, Distribution, Ocean models.

An approximate solution of the equations of thermal convective flow is obtained for a simple ocean model that incorporates lateral boundary mixing in an extreme form. It is found that the imposition of constant temperature along these boundaries causes the temperature to be nearly constant throughout the volume even though the top and bottom are maintained at different temperatures. As a consequence of this model, there is strong horizontal flow in thin layers close to the top and bottom; the thickness of these layers in a typical case is a few meters. (Author)
AD-643 850 Not available from CFSTI.

8D. GEOCHEMISTRY

HALOGEN GEOCHEMISTRY,
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
John W. Winchester, and Robert A. Duce. 1965, 5p
Availability: Published in Tech Engineering News p27-31 May 1965.

Descriptors: (*Halogens, *Geochemistry), (*Bromine, Geochemistry), (*Chlorine, Geochemistry), (*Iodine, Geochemistry), Atmosphere, Aerosols, Air pollution, Sea water, Ocean bottom, Sedimentation.

Studies of iodine, bromine and chlorine in the air-sea-sediment system are reviewed.
AD-643 795 Not available from CFSTI.

STABILITY RELATIONS IN THE Al2O3-SiO2 SYSTEM CALCULATED FROM SOLUBILITIES IN THE Al2O3-SiO2-Na3AlF6 SYSTEM,
California Univ., San Diego, La Jolla.
D. F. Weill. 6 Oct 64, 16p
Grant NSF-GP-4105
Availability: Published in Geochimica et Cosmochimica Acta v30 p223-37 1966.

Descriptors: (*Silicates, *Phase diagrams), (*Minerals, Phase studies), Alumina, Silicon dioxide, Sodium compounds, Fluorine compounds, Aluminates, Thermodynamics, Pressure, Temperature, Solubility, Petrology, Free energy, Stability.
Identifiers: Sodium hexafluoroaluminate.

The solubilities of andalusite, kyanite, sillimanite, mullite, tridymite and quartz are measured in liquids of the Al2O3-SiO2-Na3AlF6 system at 1010 and 800C. It is shown that the Gibbs free energy of solid phases in the A12O3-SiO2 system can be simply related to the activity of silica in the liquid with which they are in equilibrium. When aSiO2 is calculated according to the model of Temkin for fused salts the free energy relations in calories are as follows. At 1010C; sillimanite to andalusite, 75; sillimanite to 1/3 (mullite + tridymit), 345; sillimanite to corundum + tridymite, 1273. At 800C; sillimanite to andalusite, 24; sillimanite to 1/3 (mullite + quartz), 598; sillimanite to kyanite, 1293; sillimanite to corundum + quartz, 1341. A pressure-temperature phase equilibrium diagram is calculated for the solid portion of the Al2O3-SiO2 system which gives a triple point, andalusite-kyanite-sillimanite, at approximately 410C, 2400 bars. The PH2O-T equilibrium curve for the reaction muscovite + quartz = K-feldspar + sillimanite + H2O is found to lie approximately 60-80C below the curve for the simple breakdown of muscovite. (Author)
AD-644 128 Not available from CFSTI.

8E. GEODESY

DETERMINATION OF THE PARAMETERS OF THE OUTCROPPED DISTURBING LAYER BODIES ACCORDING TO DELTA g ANOMALIES,
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
O. D. Ivanov, and V. A. Borodin. 1966, 11p
ACIC-TC-1141
Trans. of Razvedka i Okhrana Nedr (USSR), v32 n7 p38-41 1966.

Descriptors: (*Gravity, *Geodesics), Numerical analysis, Maps, Density, USSR.
Identifiers: Gravity anomalies.

The article describes the methods for determining the depths of occurrences of the lower boundary H, thickness 2d, angle of inclination and excess density of vertical and sloping three dimensional bodies which come to the day surface or are located close to it.
AD-643 484 HC$3.00 MF$0.65

ON THE PROPAGATION OF GRAVITATIONAL FIELDS IN MATTER,
Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.
Peter Szekeres. 14 Sep 65, 12p
AFOSR-66-2199
Contract AF 49(638)-1527
Availability: Published in Journal of Mathematical Physics v7 n4 p751-61 Apr 1966.

Descriptors: (*Gravity, Propagation), Fluids, Electromagnetic fields, Tensor analysis, Fluid mechanics.

A purely covariant treatment is made of those solutions of the Einstein field equations which represent pure gravitational radiation propagating in fluid and electromagnetic media. The analysis involves a discussion of the full Bianchi identities in carefully selected tetrad frames. In this way the interaction between the gravitational field and the medium is transferred to a coupling between a preferred frame for the gravitational field and one for the matter field. The gravitational radiation no longer propagates along shear-free null geodesics, as it does in vacuum, and the shear and ray curvature of the propagation vector are shown to depend directly on the properties of the medium. Some new solutions of the field equations, representing transverse gravitational waves propagating in an electromagnetic field, are exhibited and discussed in some detail. It is shown that no such solutions exist, at least in simple cases, for perfect fluids. Finally, the treatment is compared with the more usual electromagnetic treatment, and it is shown why the theories require basically different approaches. (Author)
AD-643 672 Not available from CFSTI.

EFFECTS OF PRECESSION AND NUTATION.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. P. Murphy. Aug 66, 16p NASA-TM-X-55600, X-547-66-363

Descriptors: *Earth, *Nutational oscillation, *Precession, Equator, Equinox, Nutation, Oscillation, Transformation.

For abstract, see STAR 05 02.
N67-11375 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS ON ARTIFICIAL EARTH SATELLITES, NO. 70.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 02.
N67-11990 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS ON ARTIFICIAL EARTH SATELLITES, NO. 72.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 02.
N67-11992 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS ON ARTIFICIAL EARTH SATELLITES, NO. 73.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 02.
N67-11993 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS OF ARTIFICIAL EARTH SATELLITES, NO. 74.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
For primary bibliographic entry see Field 22B.
For abstract, see STAR 05 02.
N67-11994 HC$3.00 MF$0.65

8F. GEOGRAPHY

ON THE SAVANNA VEGETATION OF CALABOZO, VENEZUELA AND RUPUNUNI, BRITISH GUIANA.
McGill Univ., Montreal (Quebec). Dept. of Geography.
For primary bibliographic entry see Field 6C.
AD-643 506 Not available from CFSTI.

POLAR DESERT SOILS.
Arctic Inst. of North America, Washington, D. C.
For primary bibliographic entry see Field 8M.
AD-643 786 Not available from CFSTI.

BIBLIOGRAPHY OF MATERIALS ON SELECTED GROUPS IN THE REPUBLIC OF VIETNAM.
American Univ., Washington, D. C. Center for Research in Social Systems.
For primary bibliographic entry see Field 5B.
AD-643 989 HC$3.00 MF$0.65

BARBUDA RECONNAISSANCE.
Technical rept.,
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
Richard J. Russell, and William G. McIntire. 15 Sep 66, 62p TR-11-Pt-J, Contrib-66-7
Contracts Nonr-1575 (03), Nonr-1575 (00)
Rept. on Caribbean Beach Studies.

Descriptors: (*Lesser Antilles, Geography), Beaches, Coral reefs, Terrain, Limestone, Rock (Geology), Sand.
Identifiers: Barbuda.

Barbuda, northeastern island of the Lesser Antilles, a short distance north of Antigua, is surrounded by coral reefs and shallow water that excludes landing by other than small craft. Its approaches are ordinarily considered the most dangerous in the West Indies, and many wrecks are strewn along its reefs. This low, trade-wind island consists wholly of Quaternary coral reef-flat debris. Almost lacking in soil, it offers extremely limited agricultural possibilities and bears a vegetational cover of dry woodland more xerophytic in appearance than might be suggested by 39-inch annual rainfall. The limestone surface bears no streams, but adequate ground water occurs at shallow depth, most of which is brackish, but useful for stock, irrigation, or even drinking. The 1100 inhabitants are descended from slaves who live as a highly socialistic group under the administration of a Warden from the Government of Antigua, depending on remittances from abroad for most of their small income. The paper describes Recent and late Pleistocene reefal and clastic deposits, gives considerable attention to origin of beach cusps and accretion deposits with conspicuous beach-ridge systems, and emphasizes similarities between deposition taking place today and during a 20-foot high stand of late Pleistocene seas. (Author)
AD-644 020 HC$3.00 MF$0.65

ESSAYS ON COMMODITY FLOWS AND THE SPATIAL STRUCTURE OF THE INDIAN ECONOMY.
Chicago Univ., Ill. Dept. of Geography.
For primary bibliographic entry see Field 5C.
AD-644 152 HC$3.00 MF$0.65

8G. GEOLOGY AND MINERALOGY

RECENT ALGAL STROMATOLITES FROM THE CANARY ISLANDS.
Technical rept.,
Rhode Island Univ., Kingston. Narragansett Marine Lab.
Robert L. McMaster, and J. Towne Conover.
Dec 66, 10p TR-4, Ref-66-6
Contract Nonr-396 (08)
Availability: Published in The Journal of Geology v74 n5 pt1 p647-52 Sep 1966.

Descriptors: (*Marine geology, *Algae), Atlantic Ocean, Canary Islands, Calcite, Classification, Geometric forms.

Algal stromatolites (oncolites) occur on the insular shelves of the Canary Islands in the eastern Atlantic. Specimens from an unnamed bank in these islands are made up predominantly of the encrusting nullipore, Goniolithon accretum; vary in size between 0.5 and 10.0 cm; are composed of calcite in association with magnesium and appreciable aragonite; and show distinct physicochemical and biogenic corrosion. An age of the interior of one oncolite was estimated by C14 to be 1,500 plus or minus 100 years B.P. On the bottom the oncolites occur in varying concentrations or in definite bands, ripple troughs, which are oriented northeast-southwest. (Author)
AD-643 588 Not available from CFSTI.

COMPARISON OF INTERGLACIAL MARINE STRATIGRAPHY IN VIRGINIA, ALASKA, AND MEDITERRANEAN AREAS.
Technical rept.,
Yale Univ., New Haven, Conn. Dept. of Geology.
Richard Foster Flint. 1966, 13p TR-8
Contract Nonr-609 (40)
Availability: Published in American Journal of Science v264 p673-84 Nov 1966.

Descriptors: (*Stratigraphy, Virginia), Alaska, Marine geology, Mediterranean Sea islands.

Stratigraphic and morphologic features in a sector of the coastal plain in southern Virginia define several former positions of relative sealevel, of pre-Wisconisn Pleistocene age. Comparison of the stratigraphic features with well-documented features of somewhat similar character (1) in the vicinity of Nome, Alaska, and (2) on the island of Mallorca shows similarities among the three seuences. The similarities are independent of altitude, a parameter considered unreliable in the existing state of knowledge. They suggest that with accumulation of further data, long-distance correlation of at least some Pleistocene strandline features, by conventional stratigraphic methods, can be expected. (Author)
AD-643 619 Not available from CFSTI.

SEISMICITY, TECTONISM, AND SURFACE FAULTING IN THE WESTERN UNITED STATES DURING HISTORIC TIME,
Nevada Univ., Reno. Mackay School of Mines.
For primary bibliographic entry see Field 8K.
AD-643 634 Not available from CFSTI.

A PROPOSED LAW OF CORRESPONDING STATES FOR OXIDE COMPOUNDS.
Revised ed.,
Lamont Geological Observatory, Palisades, N. Y.
Orson L. Anderson. 1 Jul 66, 11p
AFOSR-66-2812
Contract AF 49 (638)-1355, Grant NSF-GP-4437
Availability: Published in Journal of Geophysical Research v71 n20 p4963-70 Oct 15 1966.

Descriptors: (*Minerals, Mechanical properties), (*Oxides, Mechanical properties), (*Aluminum compounds, Mechanical properties), (*Magnesium compounds, Mechanical properties), Pressure, Density, Mathematical analysis.
Identifiers: Aluminum oxides, Magnesium oxides.

Recent measurements on two oxides show that there exists a pressure P* for A12O3 (and for MgO) for which the density and the bulk modulus at that pressure have the same values as those for stishovite at room temperature. For A12O3, P* is 271 kb; and for MgO, P* is 438 kb. It can be shown that the properties of MgO at 205 kb are equivalent, in this sense, to the properties of A12O3 at 1 atm. Data on similar properties of other oxide compounds (oxides, silicates, and min-

erals with oxygen anions) though not as definitive, reveal the same trend. The following law of corresponding states is therefore proposed as a working hypothesis for mechanical properties of the earth's mantle: The value of specific volume and bulk modulus of one oxide compound can be converted to the corresponding quantities appropriate to another oxide compound by a change in scale of either pressure or temperature. (Author)
AD-643 639 Not available from CFSTI.

PHENACITE-SPINEL TRANSITION IN LiAlGeO4.
Chicago Univ., Ill. Dept. of the Geophysical Sciences.
For primary bibliographic entry see Field 20L.
AD-643 790 Not available from CFSTI.

CORAL CAP OF BARBADOS.
Technical rept.,
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
Richard J. Russell. 1 Nov 66, 9p TR-11-Pt-K, Contrib-66-8
Contract Nonr-1575 (03)
Rept. on Caribbean Beach Studies.
Availability: Published in Tijdschrift Van Het Koninklijk Nederlandsch Aardrijkskundig Genootschap v83 n3 p298-302 1966.

Descriptors: (*Lesser Antilles, *Structural geology), Coral reefs, Stratigraphy, Beaches.
Identifiers: Barbados.
AD-643 912 Not available from CFSTI.

BARBUDA RECONNAISSANCE.
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
For primary bibliographic entry see Field 8F.
AD-644 020 HC$3.00 MF$0.65

COMPARATIVE TECTONICS OF THE BASE OF THE OLD PLATFORMS AND THE HISTORY OF THEIR FORMATION.
Technical translation,
Aeronautical Chart and Information Center, St. Louis, Mo. Linguistic Section.
M. V. Muratov. Nov 66, 74p ACIC-TC-1101 TT-67-60316
Sravnitelnaya Tektonika Fundamenta Drevnikh Platform i Istoriya Ikh Formirovaniya, trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Geologiya i Razvedka (USSR), v9 n3 48p 1966.

Descriptors: (*Structural geology, Stratigraphy), (*Folds (Geology), Structural geology), Geologic age determination, Sedimentary rock, Ice, Deposits, Rock (Geology), Continental shelves, Pacific Ocean, Atlantic Ocean, Mountains, Separation.

The frameworks of all the continents are the following ten old platforms: Eastern-European, Siberian, Chinese-Korean, South-Chinese, North-American, South American (Brazilian), African, Indian, Australian and Antarctic. The latter five platforms according to recent concepts are fragments of the single southern platform or of the 'old' continent Gondwana.
AD-644 095 HC$3.00 MF$0.65

STABILITY RELATIONS IN THE Al2O3-SiO2 SYSTEM CALCULATED FROM SOLUBILITIES IN THE Al2O3-SiO2-Na3AlF6 SYSTEM,
California Univ., San Diego, La Jolla.
For primary bibliographic entry see Field 8D.
AD-644 128 Not available from CFSTI.

DESERT SOIL COLLECTION AT THE JPL SOIL SCIENCE LABORATORY.
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
G. B. Blank, R. E. Cameron, and D. R. Gensel.
15 Oct 66, 160p NASA-CR-79873, JPL-TR-32-977
Contract NAS7-100

Descriptors: *Desert, *Geology, *Soil, Alkali, Climate, Environment, Microorganism, Photograph, Rock, Salt, Sample, Terrain.

For abstract, see STAR 05 02.
N67-11325 HC$3.00 MF$0.65

MULTIDISCIPLINARY RESEARCH LEADING TO UTILIZATION OF EXTRATERRESTRIAL RESOURCES QUARTERLY STATUS REPORT, 1 JUL. - 1 OCT. 1966.
Bureau Of Mines, Minneapolis, Minn. Twin Cities Mining Research Center.
1 Oct 66, 32p NASA-CR-80121
NASA ORDER R-09-040-001

Descriptors: *Lunar surface, *Rock, Activity, Adsorption, Discipline, Formation, Gas, Geology, Literature, Lunar, Multiple, Research, Sample, Search, Simulation, Surface.

For abstract, see STAR 05 02.
N67-12268 HC$3.00 MF$0.65

8H. HYDROLOGY AND LIMNOLOGY

FOURTH-YEAR LABORATORY AND FIELD INSPECTION OF EXPERIMENTAL PROTECTIVE LININGS, SOUTHSIDE CANAL -- COLLBRAN PROJECT, COLORADO,
Bureau of Reclamation, Denver, Colo. Chemical Engineering Branch.
For primary bibliographic entry see Field 11C.
PB-173 626 HC$3.00 MC$0.65

8J. PHYSICAL OCEANOGRAPHY

A SEA-BOTTOM SAMPLER THAT COLLECTS BOTH WATER AND SEDIMENT SIMULTANEOUSLY.
Technical rept.,
Rhode Island Univ., Kingston. Narragansett Marine Lab.
D. R. Schink, K. A. Fanning, and John Piety. Dec 66, 13p TR-3, Ref-66-5
Contract Nonr-396 (08)
Availability: Published in Sears Foundation: Journal of Marine Research v24 n3 p365-73 Sep 15 1966.

Descriptors: (*Samplers, Ocean bottom), (*Ocean bottom sampling, Oceanographic equipment), Sedimentation, Sea water, Instrumentation.

A simple sampler, assembled mainly from commercially available equipment, is described. It simultaneously collects water samples at 1, 2, 3, 4, 5, and 6 m above the sea floor and takes a short core at the same location. (Author)
AD-643 585 Not available from CFSTI.

THE ISOTOPIC COMPOSITION OF STRONTIUM IN SURFACE WATER FROM THE NORTH ATLANTIC OCEAN.
Revised ed.,
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
P. M. Hurley, G. Faure, and J. L. Powell. 12 Nov 64, 12p
Contract Nonr-1841 (74), AT (30-1)-1381
Revision of manuscript submitted 17 Feb 64. Prepared in cooperation with Ohio State Univ. and Oberlin Coll.
Availability: Published in Geochimica et Cosmochimica Acta v29 p209-20 1965.

Descriptors: (*Atlantic Ocean, *Strontium), (*Isotopes, Strontium), Sea water, Radioactive isotopes, Geochemistry, Surfaces, Measurement.

The isotopic composition of strontium in surface water from ten localities in the North Atlantic Ocean has been determined. The results support the conclusion that the Sr87/Sr86 ratio of the ten samples is constant within experimental errors. Eight of the ten samples came from the western half of the North Atlantic from the Bahamas to the Northumberland Straits of Nova Scotia. Two samples originated from the vicinity of the West African coast. The mean Sr87/Sr86 ratio is 0.7093 plus or minus 0.0005 (sigma), relative to Sr86/Sr88 = 0.1194. This value is in agreement with determinations of most previous analysts. A model is proposed which describes the isotopic composition of strontium in the oceans as a mixture of three isotopic varieties of strontium originating as weathering products of three types of rocks on the continents and in the ocean basins. (Author)
AD-643 616 Not available from CFSTI.

THE NAVAL MISSILE CENTER WATER SAMPLER: AN INTEGRAL BATHYTHERMOGRAPH AND WATER-SAMPLING APPARATUS FOR USE FROM SHIPS UNDER WAY.
Technical memo.,
Naval Missile Center, Point Mugu, Calif.
N. Kamalian. 1 Dec 66, 14p NMC-TM-66-55

Descriptors: (*Sea water, *Samplers), Bathythermographs, Design, Test equipment, Operation.
Identifiers: Neptune project.

The Naval Missile Center water sampler was developed for use from a moving ship in the Ships of Opportunity programs. The water sampler has an air chamber that is pressurized to a pressure proportional to the water pressure at which the sample is to be taken. Two versions of the sampler were developed. One has a wing and is towed in a negative attitude. The other has no wing and is lowered on a cable of a bathythermograph (BT) winch. Both versions operate on a cable from a BT-type winch; however, the version with a wing can operate from other types of winches as well. With both versions, a BT section incorporated in the design between the inlet and sampler sections allows BT readings to be obtained at the same time that a sample is obtained. A prototype of the water sampler with a wing was designed and fabricated, and then tested successfully at depths down to 150 feet and at speeds of approximately 10 knots. Further tests were precluded by loss of the prototype water sampler at sea. The tests completed indicate that: (1) A water sampler based on this design is a feasible means of gathering water samples at speeds ranging from 0 to at least 10 knots at depths of at least 150 feet. (2) Depths and speeds of sample gathering can be increased. (3) Further tests are necessary to determine that the water sampler operates satisfactorily at greater depths and speeds. (Author)
AD-643 650 HC$3.00 MF$0.65

LATERAL BOUNDARY MIXING IN A SIMPLE MODEL OF OCEAN CONVECTION.
Stanford Univ., Calif. Dept. of Physics.
For primary bibliographic entry see Field 8C.
AD-643 850 Not available from CFSTI.

8K. SEISMOLOGY

SEISMICITY, TECTONISM, AND SURFACE FAULTING IN THE WESTERN UNITED STATES DURING HISTORIC TIME,
Nevada Univ., Reno. Mackay School of Mines.
Alan Ryall, David B. Slemmons, and Larry D. Gedney. 21 Feb 66, 34p
AFOSR-66-2811
Grants AF-AFOSR-646-64, NSF-GP-5034
Availability: Published in Bulletin of the Seismolo-

gical Society of America v56 n5 p1105-35 Oct 1966.

Descriptors: (*Seismology, Faults (Geology)), (*Faults (Geology), Geologic age determination), Structural geology, Earthquakes, Maps, Sampling, Seismological stations, Fracture (Mechanics), Propagation.

Maps of tectonic flux are presented for the conterminous United States west of longitude 109W, for periods of time before and after 1932, and for the entire historic period through 1961. The most active continuous seismic zone in this region during historic time extended over 750 km, from a point off the California coast near Ventura to Winnemucca in north-central Nevada. Although this zone is characterized by a discontinuous line of historic surface faulting, it is neither sharply defined by, nor closely related to structures along its path that are generally considered to be the major tectonic elements of the region. The broad areal extent of this, and five other active zones, suggests that the tectonic processes causing earthquakes and surface faulting in the western United States are distributed over broad regions, and are not confined to geologic or physiographic provinces. Seismicity maps for different periods indicate that seismic activity in some areas has shifted with time. Within major seismic zones, gaps in the seismicity pattern are filled in by successive large earthquakes.
AD-643 634 Not available from CFSTI.

VESIAC MONTHLY BULLETIN OF VELA UNIFORM RESEARCH PUBLICATIONS.
Michigan Univ., Ann Arbor. Inst. of Science and Technology.
15 Oct 66, 17p VESIAC Bull-45
See also AD-639 954.

Descriptors: (*Seismology, Bibliographies), Seismic waves, Abstracts, Earthquakes, Geophysics, Nuclear explosions.
Identifiers: VESIAC, Vela Uniform.

Approximately 34 references are listed.
AD-643 741 HC$3.00 MF$0.65

RESEARCH IN SEISMOLOGY.
Annual rept., 1 Nov 65-31 Oct 66,
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
31 Oct 66, 42p
Contracts AF 49 (638)-1632, ARPA Order-292

Descriptors: (*Seismology, Scientific research), Seismic waves, Velocity, Structural geology, Gravity, Propagation, Oscillation, Earthquakes, Predictions, Seismological stations, Theory.
Identifiers: LASA.

The velocity structure in the earth's mantle is determined using the travel times and travel-time slopes of P-waves recorded at LASA. The results show anomalous velocity gradients at depths of 700, 1200, and 1900 km. Both surface wave dispersion data and dt/d delta data show the presence of lateral heterogeneities in the upper and lower mantle. Theoretical studies of acoustic and gravity wave propagation in the atmosphere-ocean systems, affected of aftershocks on free oscillations, and response of layered spherical earth to point sources have been described. (Author)
AD-643 966 HC$3.00 MF$0.65

8L. SNOW, ICE, AND PERMAFROST

INFLUENCE OF VEGETATION ON PERMAFROST.
Research paper,
National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
R. J. E. Brown. Oct 66, 8p RP-298
NRC-9274
Availability: Published in Proceedings: Permafrost International Conference, NAS-NRC, Publication 1287 p20-25 Nov 1963.

Descriptors: (*Permafrost, *Plants (Botany)), Heat transfer, Climatology, Evaporation, Terrain, Drainage, Melting.

The paper reviews various ways in which vegetation affects permafrost. Some mechanisms add heat to the ground, others facilitate heat loss from the ground. Some add heat at one time and contribute to heat loss another time. Influences of vegetation are almost all reversible depending on the conditions under which they occur. The complexity and multifaceted effects of vegetation on permafrost often lead to a situation where under one set of conditions a plant community decreases the soil temperature and increases it under other conditions. It is very difficult to attach absolute quantities to each facet of the vegetation influence--total them, and arrive at the resultant direction and magnitude of heat flow at a particular time, much less perform this operation for all the past influences and assess their effect on the present permafrost situation. Even if each factor could be measured quantitatively, the contribution of some is so minute that the cumulative error would be unrealistic. In addition, there are factors which are probably not even known or possible to measure. The best solution appears to be to measure obvious effects of vegetation, such as depth of thaw, temperatures, extent and thickness of permafrost which are manifestations of the net heat gains and heat losses to the ground, and relate these to variations in environmental components. (Author)
AD-643 468 Not available from CFSTI.

RELATION BETWEEN MEAN ANNUAL AIR AND GROUND TEMPERATURES IN THE PERMAFROST REGION OF CANADA.
Research paper,
National Research Council of Canada, Ottawa (Ontario). Div. of Building Research.
R. J. E. Brown. Oct 66, 8p RP-296
NRC-9272
Availability: Published in Proceedings: Permafrost International Conference, NAS-NRC, Publication 1287 p241-6 Nov 1966.

Descriptors: (*Permafrost, Canada), Temperature, Air, Climatology, Terrain, Meteorological parameters.

It appears that an accurate prediction of mean annual ground temperature and the occurrence of permafrost at a site solely from the mean annual air temperature is subject to variations caused by other climatic and terrain factors already noted. Many more observations are required before anything more than a broad relation can be established. This is a formidable but, hopefully, not impossible task. (Author)
AD-643 611 Not available from CFSTI.

8M. SOIL MECHANICS

POLAR DESERT SOILS.
Technical rept.,
Arctic Inst. of North America, Washington, D. C.
J. C. F. Tedrow. 7 Jan 66, 8p
Contract Nonr-3996 (01)
Prepared in cooperation with Rutgers - The State Univ., New Brunswick, N. J.
Availability: Published in Soil Science Society of America Proceedings v30 n3 p381-7 May-Jun 1966.

Descriptors: (*Polar regions, Deserts), (*Arctic regions, *Soils), Plants (Botany), Classification, Chemical analysis, Climatology, Distribution, Lakes.

The northern extremeties of ice-free land are mantled primarily with Polar Desert soils. Polar Desert soils are sparsely colonized by vascular plants and in many instances the organic component scarcely enters the soil system. Low temperature, relatively dry soil conditions, a desert pavement, mildly acid to alkaline reaction, and salt efflorescences commonly characterize the Polar Desert soils. (Author)
AD-643 786 Not available from CFSTI.

LABORATORY STRESS-DEFORMATION CHARACTERISTICS OF SOILS UNDER STATIC LOADS.
Texas Univ., Austin.
R. F. Dawson, and O. I. Ghazzaly. Oct 66, 191p
NASA-CR-571
Grant NSG-604

Descriptors: *Soil, *Static deformation, *Stress and load, Characteristics, Clay, Deformation, Experiment, Literature, Load, Moisture, Pressure, Sand, Static, Strain, Stress, Survey.

For abstract, see STAR 05 02.
N67-11947 HC$3.00 MF$0.65

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. COMPONENTS

MAGNETOSTRICTIVE SONAR TRANSDUCERS.
Navy Electronics Lab., San Diego, Calif.
For primary bibliographic entry see Field 17A.
AD-643 528 HC$3.00 MF$0.65

INTEGRATED SILICON DEVICE TECHNOLOGY. VOLUME XII. MEASUREMENT TECHNIQUES.
Research Triangle Inst., Durham, N. C.
For primary bibliographic entry see Field 9E.
AD-643 610 HC$3.00 MF$0.65

STUDY FOR GENERALIZED MODEL FOR SEMICONDUCTOR RADIATION RESPONSE PREDICTION.
Nortronics, Newbury Park, Calif.
For primary bibliographic entry see Field 20L.
AD-643 652 HC$3.00 MF$0.65

SOLID STATE IMAGE INTENSIFIERS.
Monthly technical engineering rept. no. 7, 1-31 Oct 66,
Westinghouse Electric Corp., Elmira, N. Y. Electronic Tube Div.
M. A. Novice, and Z. Szepesi. 11 Nov 66, 5p
Contract N61339-66-C-0064
See also AD-637 171.

Descriptors: (*Image intensifiers (Electronics), *Solid state physics), Phosphorescent materials, Optical images, Photoelectric materials, Cadmium alloys, Selenium alloys, Sintering, Metal films.

A series of experiments was made for checking the reproducibility and improving the uniformity of the image intensifier panel. Panels were made on titanium dioxide coated substrates and with repeated settling and sintering of the PC layer. Experiments have been started with CdS. Several batches of doped powders were prepared with copper and chlorine, bromine, and iodine impurities. Field excited currents have been recorded and will be evaluated. Insulating opaque films with accep-

table characteristics were prepared by evaporating indium and magnesium fluoride. Demonstration samples of black films, EL panels and image intensifier panels were prepared. (Author)
AD-643 717 HC$3.00 MF$0.65

PIEZORESISTIVE STRAIN GAGE ACCELEROMETERS.
Picatinny Arsenal, Dover, N. J. Engineering Sciences Lab.
For primary bibliographic entry see Field 14B.
AD-643 751 HC$3.00 MF$0.65

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
Final rept., 1 Jul 64-30 Jun 66,
Radio Corp. of America, Somerville, N. J. Defense Microelectronics.
M. L. Topfer, J. J. Bowe, A. H. Danis, S. G. Ellis, and J. J. Fabula. Nov 66, 139p
ECOM-00231-F
Contract DA-28-043-AMC-00231 (E)
See also AD-639 433.

Descriptors: (*Transistors, Semiconducting films), Microstructure, Cadmium compounds, Sulfides, Semiconductor devices, Cadmium alloys, Selenium alloys, Photoelectric effect, Manufacturing methods, Silicon compounds, Oxides, Capacitance, Voltage, Surface properties, Masking, Gates (Circuits).

The report covers the work on the thin-film polycrystalline field-effect triode during the period of July 1, 1964 to June 30, 1966. All of the work on the contract is reviewed. The following work done during the eighth quarter is also covered. The behavior of the reversible gate instability at temperatures between -40C and +60C is discussed. The investigation was carried out to determine the variation of the instability mechanism with temperature. These initial measurements are too preliminary to draw conclusions. The masks for the four-input NOR/OR gate circuit were received, and the wire grille was fabricated. Initial trial runs with these masks to evaluate the alignment were completed and proved satisfactory. Fabrication of the integrated circuit was initiated. Work was initiated to investigate the controlled deposition and nucleation of semiconductor films, and an investigation of gate threshold shifts was carried out, in order to gain a better understanding of the mechanism of the TFT instability. (Author)
AD-643 779 HC$3.00 MF$0.65

DEVICE PERFORMANCE CHARACTERISTICS AS RELATED TO RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Nortronics, Newbury Park, Calif. Applied Research Dept.
For primary bibliographic entry see Field 20B.
AD-643 783 HC$3.00 MF$0.65

ELECTRODELESS PLASMA EXPERIMENTS,
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
For primary bibliographic entry see Field 20I.
AD-643 787 HC$3.00 MF$0.65

THE PRELIMINARY STUDY OF THE MAGNETIC FIELD ASSOCIATED WITH CIRCULAR COILS,
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
For primary bibliographic entry see Field 20C.
AD-643 789 HC$3.00 MF$0.65

COUPLED OSCILLATIONS OF CAVITY RESONATORS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. A. Vaynshteyn. 30 Sep 66, 17p FTD-TT-65-1419
Edited trans. of Elektronika Bolshikh Moshchnostei (USSR) n3 p216-30 1964.

Descriptors: (*Cavity resonators, Oscillation), Electromagnetism, Waveguides, Waveguide couplers, USSR.

The article discusses some problems relating to the theory of coupled electromagnetic oscillations in cavity resonators. Section 1 investigates two resonators with rotational symmetry coupled through a small circular aperture in their common wall, the center of which aperture lies on the axis of rotation, for oscillations of the H sub 01 mode. The coupling coefficient in such a system is proportional to f (5) (where f is the aperture radius) and in the general case (analyzed in Section 2) the circular aperture provides the closest coupling and the coupling coefficient is proportional to f (3). Section 3 examines the oscillations in cavity resonators (waveguide sections) for which the coupling coefficient is arbitrary. (Author)
AD-643 978 HC$3.00 MF$0.65

SEMICONDUCTOR NUCLEAR PARTICLE COUNTERS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 18D.
AD-644 024 HC$3.00 MF$0.65

INTERFERENCE PHOTOCATHODES OF INCREASED YIELD WITH FREELY SELECTIVE SPECTRAL MAXIMUM,
Institute of Modern Languages, Inc., Washington, D. C.
K. Deutscher. Dec 66, 28p
TT-67-60318, AERDL-T-1879-66
Contract DA-44-009-AMC-1563 (T)
Interferenz-Photokathoden Erhoehter Ausbeute mit Frei Waehlbarem Spektralem Maximum, trans. of Zeitschrift fuer Physik (West Germany), v151 p537-55 1958.

Descriptors: (*Photocathodes, Interference), Metal films, Dielectrics, Reflectors, Photoelectric materials, Reflectivity, Photoelectric effect, West Germany.

The partially permeable metal film of an interference reflector is designed as photoelectrically sensitive film. The reflectivity of the interference photocathode then is zero and/or very low for radiation of a freely selective given wavelength. The greater part of the irradiated luminosity is absorbed in the photofilm. As contrasted with the customary photoelectric monolayer, absorption was increased by a factor of three and electron emision, however, by a factor of nine. This surprising increase of yield is interpreted by the fact that it is possible, in the interference photocathode, to almost completely absorb the luminous energy in the flim lamellae near the surface. By reason of the short range of the photoelectrons in the metal, only the electrons excited in the film lamellae close to the surface have a high probability of emission. The increase of yield over the customary photofilm consequently has as basis that the irradiated luminous energy is absorbed almost completely and the layers have a high effective quantum yield due to the efficient absorption gradient. (Author)
AD-644 149 HC$3.00 MF$0.65

BREAKDOWN IN VACUUM DEPOSITED THIN FILM SILICON MONOXIDE CAPACITORS SUPPLEMENT TO FINAL REPORT.
Auburn Univ., Ala. Dept. Of Physics.
P. J. Hayes. Aug 66, 165p NASA-CR-79925
Contract NAS8-11279

Descriptors: *Capacitor, *Electric breakdown, *Silicon oxide, *Thin film, *Vacuum deposition, Breakdown, Deposition, Electric, Film, Monoxide, Oxide, Pattern, Rate, Removal, Silicon, Stress, Substrate, Temperature, Thin, Vacuum, Voltage.

For abstract, see STAR 05 02.
N67-11855 HC$3.00 MF$0.65

STUDY OF FAILURE AND RELIABILITY IN MICROELECTRONIC DEVICES QUARTERLY REPORT.
Librascope, Inc., Glendale, Calif. Reliability Dept.
30 Nov 65, 122p NASA-CR-77141, REPT.-2-0412
Contract NAS12-72

Descriptors: *Detection, *Failure mode, *Microelectronics, Aluminum, Bond, Device, Failure, Gold, Life, Mode, Oxide, Reliability, Stress, Temperature.

For abstract, see STAR 05 02.
N67-11967 HC$3.00 MF$0.65

SWELLING TESTS WITH CABLE INSULATING MATERIALS IN FOUR TYPES OF OIL.
Rubber Research Inst. Tno, Delft (Netherlands).
For primary bibliographic entry see Field 11G.
For abstract, see STAR 05 02.
N67-11999 HC$3.00 MF$0.65

HIGH POWER SWITCHING TRANSISTOR FINAL REPORT.
Itt Federal Labs., Palo Alto, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena. Semiconductors Product Lab.
J. Beaudouin, and R. Finch. May 66, 49p NASA-CR-80141
Contract NASA-100, JPL-951156
Prepared For Jpl

Descriptors: *N-p-n junction, *Silicon transistor, *Switching element, Chip, Design, Element, Emitter, Epitaxy, Fabrication, High power, Layer, Silicon, Switching, Theory, Transistor.

For abstract, see STAR 05 02.
N67-12161 HC$3.00 MF$0.65

DIFFERENTIATION CIRCUITS FOR AMPLITUDE- MODULATED SIGNAL ENVELOPES.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
V. I. Anisimov, and YU. F.Likhodiyevskiy. 16 Aug 66, 9p NASA-TM-X-57999
16 Aug. 1966 9 P Refs Transl. Into English From Priborostroenie (Moscow), V. 7, No. 5 1964 P 41-46

Descriptors: *Amplitude modulation, *Signal processing, *Switching circuit, Alternating, Amplitude, Circuit, Compensation, Current, Design, Differentiation, Electronics, Envelope, Modulation, Processing, Signal, Switching.

For abstract, see STAR 05 02.
N67-12230 HC$3.00 MF$0.65

DESIGN, DEVELOPMENT AND DELIVERY OF ONE (1) BREADBOARD AND THREE (3) PRODUCTION UNITS OF A 75 VA INTEGRATED STATIC INVERTER MONTHLY REPORT NO. 15.
Texas Instruments, Inc., Dallas. Semiconductor-components Div.
L. L. Glover, L. A. Hahn, P. F. Newcomb, and J. P. Vergez. Jul 66, 18p NASA-CR-80088, SC0627-766
Contract NAS8-11925

Descriptors: *Flip-flop, *Static inverter, *Transistor, Array, Breadboard, Component, Emitter, Epi-

taxy, Growth, Integration, Inverter, Oxide, Power, Static, Stress, System.

For abstract, see STAR 05 02.
N67-12258 HC$3.00 MF$0.65

9B. COMPUTERS

HOSPITAL PHARMACY AND AUTOMATION,
System Development Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 6O.
AD-296 330 HC$3.00

SPAD FORMATTER: THE BUFFER INTERFACE BETWEEN THE SATELLITE PREDICTION COMPUTER AND THE DISPLAY.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 22C.
AD-643 561 HC$3.00 MF$0.65

OPERATING COMPUTER SYSTEM 'PROKAT',
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 13H.
AD-643 623 HC$3.00 MF$0.65

THEORY OF ADAPTIVE MECHANISMS.
Syracuse Univ. Research Inst., N. Y.
For primary bibliographic entry see Field 9E.
AD-643 691 HC$3.00 MF$0.65

MEMORY ELEMENT,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. I. Sulkhanov. 9 Sep 66, 4p FTD-HT-66-98
Unedited rough draft trans. of Patent (USSR) 170 747, appl. 872373/26-24, 25 Dec 63.

Descriptors: (*Computer storage devices, Design), Data storage systems, Patents, USSR.

The object of the invention is a memory element, which contains two cores that are penetrated by the writing, reading and output windings, is different in that to accelerate the process of reading information and to reduce the power required during its operation, it contains a preliminary writing winding; the reading and writing windings pass through both cores identically, and the output winding and the winding for preliminary reading pass through one of the cores in the direction opposite to the direction of the reading winding. (Author)
AD-643 701 HC$3.00 MF$0.65

MAGNETIC MEMORY DEVICE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
T. K. Tsogoev. 9 Sep 66, 4p FTD-HT-66-99
Unedited rough draft trans. of Patent (USSR) 170 750, appl. 902273/26-24, 28 May 64.

Descriptors: (*Computer storage devices, Design), (*Magnetic core storage, Design), Data storage systems, Patents, USSR.

The object of the invention is a magnetic memory device, which consists of interrogation leads, discharge leads and two plates, one of which is made from a material with high magnetic permeability and the other from a material with a square hysteresis group, is different in that to realize nondestructive read-out and to simplify the technology of making the device, the plates have parallel grooves and the directions of the grooves on the adjacent surfaces of these plates are mutually perpendicular, the discharge leads being placed in the grooves of the plate from the material with a square hysteresis group and the interrogation leads being placed in the grooves of the plate from the material with high magnetic permeability. (Author)
AD-643 702 HC$3.00 MF$0.65

FOREIGN SCIENCE BULLETIN, VOL. 2, NO. 11.
Library of Congress, Washington, D. C. Aerospace Technology Div.
For primary bibliographic entry see Field 5A.
AD-643 780 HC$3.00 MF$0.65

GRAPHICS.
Semiannual technical summary rept. 1 Jun-30 Nov 66,
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Jack. I. Raffel. 30 Nov 66, 8p
ESD-TR-66-583
Contract AF 19 (628)-5167, ARPA Order-691
See also AD-634 251.

Descriptors: (*Graphics, *Compilers), Display systems, Waveform generators, Networks, Man-machine systems.

The new APEX display executive is operational. The compiler-compiler, VITAL, was used to generate a number of compilers, including one for a second version of CORAL. A CRT display sequence is being constructed which will incorporate both the newly designed conic waveform generator and a character generator, and will handle as many as ten display stations. The hardware and software for the first phase of the SDC network experiment are completed - experimentation is under way. (Author)
AD-643 821 HC$3.00 MF$0.65

COMPUTER TECHNOLOGY. COMPILATION OF ABSTRACTS,
Library of Congress, Washington, D. C. Aerospace Technology Div.
Boris Doncov. 29 Sep 66, 84p ATD-66-120
TT-67-60231
Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Computers, Bibliographies), Computer storage devices, Circuits, Scanning, Digital computers, Programming (Computers).

The 69 abstracts are arranged alphabetically by author within each of the following categories: components (21 entries); design (14 entries); applications (11 entries); and associated systems (23 entries). A bibliography comprising 69 entries is included. Information included: semiconductor-controlled memory unit with increased speed of operation; tape cores as logical elements for digital computers; a magnetic parametron-type null circuit; scanning device utilizing a fiber-optical converter; model for intermediate neuron; micromodule construction techniques; electron-optical memory; magnetic logic elements; logical organization of the VNIIEM-3 control computer; small-size digital computer; electronic digital computers at the 'INFORGA-65' exhibit; information conversion device; simple failure indicator; decoding device; converters for telemetry systems using magnetic elements; experimental device for coding and entry of electrical signals into a computer. (Author)
AD-643 854 HC$3.00 MF$0.65

THE EV-80-3 ELECTRONIC COMPUTER AND ITS USE IN PLANNING-ACCOUNTING WORK,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. S. Savilov. 4 Oct 66, 42p FTD-MT-66-55
TT-67-60241
Edited machine trans. of Unidentified Russian mono. n.p., n.d.

Descriptors: (*Digital computers, Design), Programming (Computers), Management planning, Numerical methods and procedures, Input-output devices, Electronic accounting machines, USSR.
Identifiers: Accounting.

The electronic digital computer is capable of performing: (a) arithmetical operations (addition, subtraction, multiplication, and division); (b) certain logical operations (rounding, comparison); (c) auxiliary operations connected with the preparation of data for the fulfillment with them of arithmetical operations (transmission of a number, digit shift, and others). (Author)
AD-643 897 HC$3.00 MF$0.65

ALGORITHMIC DESIGNING OF CALCULATING DIGITAL COMPUTERS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. S. Linskii. 8 Aug 66, 116p FTD-MT-65-170
TT-67-60249
Edited machine trans. of Soobshcheniya po Vychislitenoi Tekhnike (USSR) v2 134p 1963.

Descriptors: (*Digital computers, Design), (*Algorithms, Digital computers), Logic circuits, Wiring diagrams, USSR.

Contents: Arrangement of Elements of Digital Computers; Placement of Wires; and Formalization of Coordination and Control of Logical-Time Diagrams.
AD-643 919 HC$3.00 MF$0.65

DIGITAL CONTROLLING MACHINE OF GENERAL INDUSTRIAL APPLICATION TSUM-1,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. S. Podakov, and V. I. Makhota. 5 Oct 66, 16p
FTD-HT-66-183
TT-67-60243
Unedited rough draft trans. of Monv. Vychislitel'naya Tekhnika Dlya Avtomatizatsii Proizvodstva. Trudy Soveshchaniya, Moscow, p221-30 1964.

Descriptors: (*Digital computers, Design), Control systems, Design, Semiconductor devices, USSR.
Identifiers: TSUM-1 machine.

The digital control machine TSUM-1 represents a small scale digital calculation machine (TSVM) on semiconductor instruments, provided with a contact device of contacting with the object (USO), including an information transformation device, block of comparing with settings, block controlling the actions and of the registration device. (Author)
AD-643 926 HC$3.00 MF$0.65

CURRENT TRENDS IN AEROSPACE COMPUTATION AND SOME IMPLICATIONS,
RAND Corp., Santa Monica, Calif.
Barry Boehm. Nov 66, 15p P-3484

Descriptors: (*Computers, *Astronautics), Computer programs, Programming (Computers), Efficiency, Standards, Mathematical analysis.

Three major trends in aerospace computing are discussed: (1) Computing power is increasing rapidly; (2) The range of applications is widening rapidly; (3) Software is scrambling to keep up with the other two. (Author)
AD-643 964 HC$3.00 MF$0.65

PROBLEMS OF INFORMATION TRANSMISSION. INSTITUTE OF INFORMATION TRANSMISSION (SELECTED ARTICLES).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. F. D'yachenko, and M. A. Aingorn. 18 Aug 66, 28p FTD-TT-65-2042
Unedited rough draft trans. of Problemy Peredachi Informatsii (USSR) n17 p35-47, 112-14 1964.

Descriptors: (*Data transmission systems, Mathematical logic), (*Algorithms, Mathematical logic), (*Photographic acutance, Optimization), USSR.

Contents: Transformation of Logical Systems of Algorithms, by V. F. D'yachenko; and Optimum Methods of Photographing Faint Objects, by M. A. Ayngorn.
AD-643 977 HC$3.00 MF$0.65

SCIENTIFIC TECHNICAL INFORMATION (SELECTED ARTICLES).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 6D.
AD-643 979 HC$3.00 MF$0.65

A REAL-TIME COMPUTING SYSTEM FOR REDUCING RADAR CROSS-SECTION DATA TO MEDIAN VALUES.
Naval Missile Center, Point Mugu, Calif.
For primary bibliographic entry see Field 17I.
AD-643 988 HC$3.00 MF$0.65

APPLICATION OF EQUIVALENT PROGRAMMING TO ALGORITHMIZATION OF CONTROL MACHINES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 12B.
AD-643 995 HC$3.00 MF$0.65

INVESTIGATIONS OF A MODEL READER ON A COMPUTER, PART II,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. P. Romanov. 27 Sep 66, 13p FTD-HT-66-512
Unedited rough draft trans. of Nauchno-Tekhnicheskaya Informatsiya (USSR) n7 p26-9 1964.

Descriptors: (*Character recognition, *Symbols), Computers, Pattern recognition, Reading machines, Russian language, Numbers, Computer programs, Models (Simulations), USSR.

The article describes a model of an optimal system for automatic reading consisting of several blocks. The images of distinguishable symbols are treated by a two-dimensional filter to suppress noises, centered and compared with standards. Then, recognition occurs based on the minimum of the mean square deviation. (Author)
AD-644 053 HC$3.00 MF$0.65

APPLICATION OF COMPUTERS IN HISTORICAL SCIENCE (FOR ANALYSIS OF MASSES OF HISTORICAL FACTS),
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. A. Ustinov. 26 Apr 66, 192p FTD-MT-65-264
TT-67-60315
Edited machine trans. of mono. Primenenie Vychislitelnykh Mashin v Istoricheskoi Nauke (dlya Analiza Massovykh Istoricheskikh Istochnikov), Moscow, 1964 231p.

Descriptors: (*Computers, *Data processing systems), Analysis, History, Tables, Design, Programming (Computers), Mathematical analysis, Data, USSR.

Contents: Presentation of mass historical sources in the form of tables; Brief information from computer technology, computer mathematics and mathematical logic; The system of instructions of an electronic computer; Questions of the method of processing and analysis of sources on computers; Classification of problems, solved in course of processing and analysis of historical sources; Analysis of historical sources on electronic computers using a system of standard algorithms and programs.
AD-644 110 HC$3.00 MF$0.65

A TIME-SHARED PROGRAM SYSTEM FOR THE SOLUTION OF THE STABILITY PROBLEM FOR PARALLEL FLOWS OVER RIGID OR FLEXIBLE SURFACES,
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
For primary bibliographic entry see Field 20D.
AD-644 162 HC$3.00 MF$0.65

PROGRAM DOCUMENTATION FOR A SELECTIVE DISSEMINATION SYSTEM FOR NASA SCIENTIFIC AND TECHNICAL INFORMATION.
International Business Machines Corp., Yorktown Heights, N. Y.
Jun 66, 226p NASA-CR-62021
Contract NASW-695

Descriptors: *Computer program, *Data retrieval, *Information processing, *Nasa program, Chart, Computer, Data, Distribution, Documentation, Flow, Format, Fortran, Ibm 7090 computer, Ibm 7094 computer, Information, Instruction, Operation, Processing, Profile, Program, Record, Retrieval, Science, Selective, Technical.

For abstract, see STAR 05 02.
N67-11242 HC$3.00 MF$0.65

AN AUTO-DIAGRAMMER.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
G. Hain, and K. Hain. Nov 66, 23p NASA-TM-X-1317

Descriptors: *Fortran ii assembly program (fap), *Pert project, Assembly, Automatic, Chart, Computer, Fap, Flow, Fortran, Logic, Program.

For abstract, see STAR 05 02.
N67-11343 HC$3.00 MF$0.65

REVISED THREE DEGREE OF FREEDOM PARTICLE TRAJECTORY PROGRAM CO3E FOR THE IBM 7094 COMPUTER.
National Aeronautics And Space Administration. Manned Spacecraft Center, Cape Canaveral, Fla.
W. R. Boykin. Oct 66, 211p NASA-TN-D-3463

Descriptors: *Computer program, *Spacecraft motion, Aerodynamics, Atmosphere, Attitude, Computer, Data, Fap, Fortran, Gravity, Ibm 7094 computer, Model, Motion, Particle, Processing, Program, Simulation, Spacecraft, Trajectory.

For abstract, see STAR 05 02.
N67-11344 HC$3.00 MF$0.65

INVISCID ANALYSIS OF THE PLUME CREATED BY MULTIPLE ROCKET ENGINES. PART II - DESCRIPTION OF THE COMPUTER PROGRAMS.
General Dynamics/Convair, San Diego, Calif. Space Sciences Lab.
L. Dattorre, G. Novak, H. U. Thommen, and V. L. Trammell. May 66, 121p NASA-CR-79741, GD/C-DBE-66-014
Contract NAS8-20101

Descriptors: *Computer program, *Jet plume, *Rocket engine, Analysis, Calculation, Chart, Computer, Flow, Input, Instruction, Interaction, Inviscid, Jet, Multiple, Plume, Program.

For abstract, see STAR 05 02.
N67-12066 HC$3.00 MF$0.65

SIGNIFICANCE ARITHMETIC FOR FORTRAN.
Oak Ridge National Lab., Tenn. Neutron Physics Div.
W. R. Burrus, and B. W. Rust. 4 Nov 66, 31p
NASA-CR-80095, ORNL-TM-1249
NASA ORDER R-104/01/

Descriptors: *Fortran, *Mathematics, Accuracy, Calculation, Data, Digit, Error, Input, Interval, Numerical, Significance, Tracing.

For abstract, see STAR 05 02.
N67-12155 HC$3.00 MF$0.65

FORTRAN PACKAGE FOR LEAST SQUARES CURVE FITTING AND THE SOLUTION OF SIMULTANEOUS EQUATIONS.
National Bureau Of Standards, Boulder, Colo. Cryogenics Div.
J. G. Hust, and R. D. Mc Carty. 10 Oct 66, 16p
NASA-CR-80100, NBS-9258
NASA ORDER R-45

Descriptors: *Fitting, *Fortran, *Least squares method, *Linear equation, Computer, Curve, Equation, Inversion, Least, Linear, Matrix, Method, Program, Simultaneous, Solution, Square.

For abstract, see STAR 05 02.
N67-12160 HC$3.00 MF$0.65

PROCEDURES FOR MANAGEMENT CONTROL OF COMPUTER PROGRAMMING IN APOLLO.
Bellcomm, Inc., Washington, D. C.
B. H. Liebowitz, E. B. Parker, III, and C. S. Sherrerd. 28 Sep 66, 206p NASA-CR-80132, TR-66-320-2
Contract NASW-417

Descriptors: *Apollo project, *Computer programming, *Management planning, Computer, Control, Format, Management, Monitor, Plan, Planning, Program, Programming, Specification, Test.

For abstract, see STAR 05 02.
N67-12167 HC$3.00 MF$0.65

BIBLIOGRAPHY OF THE COMPUTER CODES LITERATURE EXAMINED BY THE RADIATION SHIELDING INFORMATION CENTER,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 5B.
For abstract, see NSA 20 24.
ORNL-RSIC-15 HC$3.00 MF$0.65

OR TEP A FORTRAN THERMAL-ELLIPSOID PLOT PROGRAM FOR CRYSTAL STRUCTURE ILLUSTRATIONS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 20B.
For abstract, see NSA 20 24.
ORNL-3794 HC$3.00 MF$0.65

ACTIFK A GENERAL ANALYSIS CODE FOR 05R,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 20H.
For abstract, see NSA 20 24.
ORNL-3856 HC$3.00 MF$0.65

THE COMPUTER AND INFORMATION SCIENCES: A NEW BASIC DISCIPLINE.
Revised ed.,
Pennsylvania Univ., Philadelphia. Moore School of Electrical Engineering.
Saul Gorn. 16 Feb 63, 7p
Contract AF 30 (602)-2382, Grant NSF-G14096
Revision of manuscript submitted 17 Dec 62. Contracts AF 49 (638)-951, DA-36-039-sc-74047. Presented to the IFIP Congress 62: Session 50, Panel Discussion on University Education in Information Processing at Munich (Germany), Aug-27-Sep 1 62. NSF Scientific Documentation Project. Reprint, Siam Review v5 n2 p150-5 Apr 1963.

Descriptors: (*Computers, *Programming languages), Information theory, Artificial intelligence.

Grammars, Information retrieval, Mathematics, Documentation.

It is the belief of the author that a new basic discipline is emerging which might be called 'The Computer and Information Sciences'. This field makes application of concepts from the traditional fields of mathematics, philosophy, linguistics, psychology, engineering, management science, library science, etc. Like all well-defined disciplines it has, in return, applications to other disciplines, and especially to those just mentioned. Examples of general topics of study in it might be programming systems, computer system design, artificial intelligence, information retrieval, etc. The probabilistic information theory of Shannon clearly belongs to this area, but there is a theory of mechanistic information and its processing which must also be included. Thus a central topic in the new discipline would be the synthesis and analysis of mechanical languages and their processors.
PB-173 688 HC$3.00 MF$0.65

ONE-DIMENSIONAL CALCULATION OF THE TIME-DEPENDENT CONDUCTIVITY OF GASES WITH A STRONG VARIABLE SOURCE OF IONIZATION,
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 20I.
For abstract, see NSA 20 24.
UCRL-14914 HC$3.00 MF$0.65

9C. ELECTRONIC AND ELECTRICAL ENGINEERING

THE DESIGN OF ELECTRONIC EQUIPMENT FOR EASE OF MAINTENANCE: CURRENT ENGINEERING DESIGN PRACTICES.
Technical rept.,
University of Southern California, Los Angeles. Electronics Personnel Research Group.
Douglas M. Towne. Aug 65, 74p TR-41
Contract Nonr-228 (22)

Descriptors: (*Maintainability, Electronic equipment), (*Electronic equipment, Maintainability), Maintenance, Management planning, Design, Naval equipment, Research program administration, Naval research, Naval personnel, Costs, Reliability (Electronics), Operations research, Logistics, Systems engineering.

This report reviews the problem of designing electronic equipment for ease of maintenance. Stages in the development of electronic systems in the Navy are reviewed. Contractor design management problems are described, and primary and secondary engineering design cycles are discussed. A major section of the report analyzes the problem of designing for ease of maintenance, identifying objectives, variables, and categories of design strategies. A final section of the report describes a preliminary model of relationships among the major factors involved. The report concludes that at least four broad changes will be necessary before appreciable improvements can occur in electronics maintainability: changes in military customer procurement practices, the development of a technology of maintainability, specification of quantitative criteria for design, and changes in attitudes towards maintainability both on the part of the customer and the contractor which would accord it the importance it actually has in determining operational usefulness of a system.
AD-470 377 HC$3.00 MF$0.65

MOSCOW UNIVERSITY HERALD. SERIES III. PHYSICS, ASTRONOMY, VOL. 20, NO. 5, 1965: SELECTED ARTICLES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20E.
AD-643 625 HC$3.00 MF$0.65

NONLINEAR SPACE CHARGE WAVE THEORY OF THE HYDRODYNAMIC DISC-ELECTRON BEAM.
Chalmers Univ. of Technology, Goteborg (Sweden). Research Lab. of Electronics.
For primary bibliographic entry see Field 20C.
AD-643 660 HC$3.00 MF$0.65

SOVIET QUANTUM ELECTRONICS RESEARCH: COMPREHENSIVE REPORT,
Library of Congress, Washington, D. C. Aerospace Technology Div.
For primary bibliographic entry see Field 20E.
AD-643 937 HC$3.00 MF$0.65

INVESTIGATION OF NON-STATIONARY OSCILLATIONS IN NONLINEAR SYSTEMS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20K.
AD-643 960 HC$3.00 MF$0.65

THEORY OF LINEAR PULSE SYSTEMS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Ya. Z. Tsypkin. 27 Jun 66, 1041p FTD-MT-64-133
TT-67-60324
Edited machine trans. of mono. Teoriya Lineinykh Impulsnykh Sistem, Moscow, 1963 968p.

Descriptors: (*Pulse systems, Theory), (*Linear systems, Pulse systems), Control systems, Integral transforms, Stability, Synthesis, Mathematical analysis, USSR.

Contents: Pulse systems and their application; Bases of discrete Laplace transformations; Theory of open pulse systems; Investigation and calculation of open pulse systems; Theory of closed pulse systems; and Investigation and calculation of closed systems.
AD-644 108 HC$3.00 MF$0.65

NANOSECOND PULSE LOW-POWER AMPLITUDE-TO-TIME CONVERTER AND ASSOCIATED LINEAR GATE CIRCUITS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
N. M. Garrahan. Jul 66, 18p NASA-TM-X-55592, X-711-66-330

Descriptors: *Converter, *Linear circuit, *Nanosecond, Amplitude, Analyzer, Circuit, Detector, Gate, Height, Linear, Low power, Pulse, Ray, Time.

For abstract, see STAR 05 02.
N67-11370 HC$3.00 MF$0.65

STUDY OF SHORT TERM PHASE STABILITY. AN EXPERIMENTAL COHERENT FRACTIONAL FREQUENCY MULTIPLIER FOR S-BAND.
Smith Electronics, Inc., Cleveland, Ohio.
R. A. Mostrom. 1965, 24p NASA-CR-79528
Contract NAS8-11592

Descriptors: *Frequency multiplier, *S-band, Coherent, Diode, Fraction, Frequency, Generator, Harmonic, Multiplier, Oscillator, Phase, Stability, Subharmonic, Very high.

For abstract, see STAR 05 02.
N67-11682 HC$3.00 MF$0.65

FUNCTIONAL ANALYSIS OF SYSTEMS CHARACTERIZED BY NONLINEAR DIFFERENTIAL EQUATIONS.
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
R. B. Parente. 15 Jul 66, 115p NASA-CR-79493, TR-444
Grant NSG-496, Contract NSF GP-2495

Descriptors: *Differential equation, *Functional analysis, *Nonlinear system, Analysis, Calculus, Commutator, Device, Differential, Equation, Functional, Invariance, Magnetic, Nonlinear, Pendulum, Physical, Power, Series, Suspension, System, Time, Varactor, Volterra equation.

For abstract, see STAR 05 02.
N67-11727 HC$3.00 MF$0.65

SOLUTION OF NONLINEAR ALGEBRAIC EQUATIONS CHARACTERISTIC OF FILTER CIRCUITS SUMMARY TECHNICAL REPORT.
Northrop Space Labs., Huntsville, Ala.
R. G. Schroeder, F. B. Tatom, and T. J. Thomas. Sep 66, 195p NASA-CR-79506, TR-292-6-078
Contract NAS8-20183
Its Tech. Memo No. 196

Descriptors: *Circuit, *Computer program, *Digital computer, *Electronic filter, *Nonlinear equation, Algebra, Component, Computer, Differential, Digital, Electronic, Equation, Filter, Function, Nonlinear, Program, Root, Solution, Transfer.

For abstract, see STAR 05 02.
N67-11728 HC$3.00 MF$0.65

ESTIMATES OF THE STATISTICS OF RANDOMLY VARYING PARAMETERS OF LINEAR SYSTEMS.
University Of Southern Calif., Los Angeles. Dept. Of Electrical Engineering.
G. A. Bekey, and S. M. Brainin. Jun 66, 29p NASA-CR-79759, USCEE-171
Contract NGR-05-018-022

Descriptors: *Differential equation, *Identification, *Linear system, *Mathematical model, Equation, Estimation, Fokker-planck equation, Linear, Model, Parameter, Random, Regression, Statistics, System, Variable.

For abstract, see STAR 05 02.
N67-12082 HC$3.00 MF$0.65

DESIGN, DEVELOPMENT AND FABRICATION OF PROTOTYPE SEMICONDUCTOR AMPLIFIERS FINAL REPORT, 17 MAR. 1965 - 16 MAR. 1966.
Westinghouse Electric Corp., Pittsburgh, Pa. Research Labs.
H. C. Chang, N. P. Formigoni, and J. S. Roberts. 16 Mar 66, 141p NASA-CR-80170
Contract NAS8-11861

Descriptors: *Field effect transistor (fet), *Integrated circuit, *Junction transistor, *Silicon carbide, Aluminum, Amplifier, Carbide, Circuit, Crystal, Diffusion, Effect, Fabrication, Fet, Field, Gate, High temperature, Integration, Junction, Photoresistivity, Semiconductor, Silicon, Transistor.

For abstract, see STAR 05 02.
N67-12240 HC$3.00 MF$0.65

STUDY OF SHORT-TERM PHASE STABILITY FINAL REPORT, SEP. 6, 1965 - SEP. 17, 1966.
Smith Electronics, Inc., Cleveland, Ohio.
R. A. Mostrom. 17 Sep 66, 26p NASA-CR-80105
Contract NAS8-11592

Descriptors: *Acoustic generator, *Tunnel diode, Acoustic, Charge, Conversion, Diode, Electronics, Function, Generator, Mode, Noise, Step, Storage, Subharmonic, Tunnel.

For abstract, see STAR 05 02.
N67-12253 HC$3.00 MF$0.65

ALGEBRAIC METHODS FOR DYNAMIC SYSTEMS.
Santa Clara Univ., Calif.
R. C. Dorf, D. D. Siljak, and G. J. Thaler. Nov 66, 139p NASA-CR-617
Contract NAS2-2609

Descriptors: *Algebra, *Dynamic control, Analysis, Application, Coefficient, Control, Design, Dynamic, Fundamental, Linear, Mathematics, Method, Parameter, Plane, System, Theory.

For abstract, see STAR 05 02.
N67-12278 HC$3.00 MF$0.65

9D. INFORMATION THEORY

ON A DEFINITION OF BANDWIDTH.
Technical rept.,
Rome Air Development Center, Griffiss AFB, N. Y.
Jack K. Wolf. Nov 66, 29p RADC-TR-66-521

Descriptors: (*Bandwidth, Theory), Stochastic processes, Statistical functions, Integral transforms, Information theory, Modulation.

Various definitions of bandwidth are examined for non-bandlimited random processes. Properties and shortcomings of these definitions are discussed. The 'bandwidths' of several random processes are calculated and in most instances, the different definitions yield different answers. The bandwidth of an amplitude and/or angle modulated wave is calculated using one definition and the results compared to those found by Abramson who used a different definition. (Author)
AD-643 560 HC$3.00 MF$0.65

SOME RESULTS ON SINGULAR DETECTION,
Stanford Univ., Calif. Dept. of Electrical Engineering.
Thomas Kailath. 18 May 65, 26p
AFOSR-66-2293
Contracts Nonr-225 (83), AF 49 (638)-1517
Availability: Published in Information and Control v9 n2 p130-52 Apr 1966.

Descriptors: (*Mathematical models, *Detection), (*Information theory, Detection), Statistical processes.

A mathematical model that leads to singular detection (i.e., detection with arbitrarily low probability of error) is usually a poor model of the physical problem. However, in general, it has been difficult to establish the possibility of singular detection without a detailed evaluation of the probability of error. Such an evaluation is difficult because it requires the solution of various integral equations, the computation of eigenvalues, etc. In this paper some simple methods are given for predicting the possibility of singular detection of known signals in additive gaussian noise. Such methods are useful in the formulation of suitable mathematical models. (Author)
AD-643 659 Not available from CFSTI.

A METHOD OF MEASURING CODING ERRORS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. G. Likiardopulo, and Yu. V. Markov. 2 Sep 66, 5p FTD-HT-66-92
Unedited rough draft trans. of Patent (USSR) 169 294, appl. 825255/26-24, 15 Mar 63.

Descriptors: (*Coding, Errors), Measurement, Patents, USSR.

The object of the invention is a method of measuring the coding error of coders with parallel output and cyclic code is different in that, to increase the rate of measuring the error and to directly obtain the mean or root-mean-square error, a standard sawtooth voltage is periodically fed to the input of the coder and on the output replacement instants of the coded combinations are compared with a standard sequence of pulses that are synchronized with the standard sawtooth voltage and pulses are distinguished that are proportional, in duration and sign, to the coder error at separate points of the coding, and double integration or one-sided inversion with double integration produces the mean or the root-mean-square error of the coder, which is recorded by an indicator. (Author)
AD-643 711 HC$3.00 MF$0.65

SEQUENTIAL CODING SCHEMES FOR AN ADDITIVE NOISE CHANNEL WITH A NOISY FEEDBACK LINK.
Technical rept., May-Aug 66,
Harvard Univ., Cambridge, Mass. Computation Lab.
R. L. Kashyap. Aug 66, 39p TR-508
Contract Nonr-1866 (16), Grant NGR-22-007-068

Descriptors: (*Coding, Information theory), Feedback, Probability, Errors, Data transmission systems, Noise (Radio).

A coding scheme for additive Gaussian channel is developed using a noisy feedback link and D-dimensional elementary signals with no bandwidth constraint. This allows error free transmission at a rate R < R sub c where R sub c is slightly less than the channel capacity C. When there is no noise in the Feedback channel, the coding scheme reduces to a D-dimensional generalization of the coding scheme of Schalkwijk and Kailath. In addition, the expression for the probability of error is determined when T, the time of transmission rate is finite. Our scheme is also compared with the best codes which use only the forward channel. (Author)
AD-643 864 HC$3.00 MF$0.65

ADAPTIVE DECOMPOSITION OF SUPERPOSITIONS OF PROBABILITY DENSITY FUNCTIONS.
Rome Air Development Center, Griffiss AFB, N. Y.
For primary bibliographic entry see Field 12A.
AD-644 161 HC$3.00 MF$0.65

IMPLEMENTATION AND PERFORMANCE OF THE MAXIMUM-LIKELIHOOD DETECTOR IN A CHANNEL WITH INTERSYMBOL INTERFERENCE.
Northeastern Univ., Boston, Mass.
R. A. Gonsalves. Aug 66, 39p NASA-CR-79927, SR-5
Contracts NGR-22-011-013, AF 19/628/-3312

Descriptors: *Delay line, *Electronic filter, *Information theory, *Probability distribution, *Signal detector, Binary, Delay, Detector, Electronic, Error, Filter, Function, Gaussian noise, Information, Interference, Line, Matching, Maximum, Noise, Nonlinear, Optimum, Performance, Probability, Signal, Theory.

For abstract, see STAR 05 02.
N67-11857 HC$3.00 MF$0.65

ANALYTIC SIGNALS AND ZERO-LOCUS IN MULTIPLEXING SYSTEMS.
Houston Univ., Tex. Cullen Coll. Of Engineering.
L. C. Puigjaner. Aug 66, 202p NASA-CR-79929
Contract NGR-44-005-039

Descriptors: *Analytic function, *Modulation technique, *Multiplex transmission, Analysis, Computer, Crosstalk, Function, Locus, Mathematics, Model, Modulation, Multiplex, Program, Signal, System, Technique, Theory, Transmission, Wave, Zero.

For abstract, see STAR 05 02.
N67-11859 HC$3.00 MF$0.65

STUDY OF SHORT TERM PHASE STABILITY INTERIM REPORT, 16 MAR. 1964 - 16 MAR. 1965.
Smith Electronics, Inc., Cleveland, Ohio.
16 Mar 65, 57p NASA-CR-80091
Contract NAS8-11592
Flight Center, 16 Mar. 1965 57 P Refs

Descriptors: *Frequency-division multiplexing, *Parametric amplifier, *Tunnel diode, Amplifier, Diode, Division, Down-converter, Experiment, Frequency, Generation, L-band, Measurement, Model, Multiplex, Parameter, Phase, Recovery, S-band, Stability, Step, Subharmonic, Tunnel.

For abstract, see STAR 05 02.
N67-12270 HC$3.00 MF$0.65

9E. SUBSYSTEMS

DIRECT-COUPLED GYRATOR SUITABLE FOR INTEGRATED CIRCUITS AND TIME VARIATION.
Revised ed.,
Stanford Univ., Calif. Stanford Electronics Labs.
T. N. Rao, and R. W. Newcomb. 20 Jun 66, 3p
AFOSR-66-2195
Grant AF-AFOSR-337-63
Revision of manuscript submitted 3 May 66.
Availability: Published in Electronics Letters v2 n7 n.p. Jul 1966.

Descriptors: (*Integrated circuits, Electrical networks), Transistors, Resistors, Transformers, Theory, Time.
Identifiers: Gyrators, Time varying networks.

A direct-coupled gyrator circuit which can be easily realised in integrated-circuit form is described. Since the gyrator action extends to d.c., it is practicable to realise d.c. transformers by cascading two such gyrators. (Author)
AD-643 457 Not available from CFSTI.

THE TIME-VARIABLE LATTICE AND NONRECIPROCAL RLC NETWORKS.
Revised ed.,
Stanford Univ., Calif. Stanford Electronics Labs.
B. D. O. Anderson, and R. W. Newcomb. 11 Mar 66, 4p
AFOSR-66-2493
Grant AF-AFOSR-337-63
Revision of manuscript submitted 8 Nov 65.
Availability: Published in IEEE Transactions on Circuit Theory vCT13 n2 p233-5 Jun 1966.

Descriptors: (*Electrical networks, Theory), Matrix algebra, Design, Synthesis, Resistors, Capacitors, Inductance.
Identifiers: Time varying systems.

It is shown that the properties useful for design of the lattice extend to the n-post and time-variable case. From this a quasilossless synthesis results by factoring S sub 21, the (2,1) scattering matrix element (equivalent to terminated voltage gain). (Author)
AD-643 459 Not available from CFSTI.

TUNED INTEGRATED CIRCUITS.
Quarterly rept., no. 2, 1 Jul-30 Sep 66,
Westinghouse Research Labs., Pittsburgh, Pa.

W. E. Newell, and S. M. Zalar. Dec 66, 27p
ECOM-02045-2
Contract DA-28-043-AMC-02045 (E)

Descriptors: (*Integrated circuits, *Tuning devices), Vapor plating, Vacuum apparatus, Cadmium compounds, Sulfides, Films, Resonators, Piezoelectric crystals, Resonance, Silicon, Gold, Impedance matching.
Identifiers: Cadmium sulfide.

Apparatus and improved procedures for the vacuum co-evaporation of thick CdS films (5 to 15 microns) are described. A correlation between the thickness of CdS film piezoresonators, their resonant frequency and the electrode areas, required for the 50 ohm impedance matching, was worked out. First film resonances (as distinguished from substrate resonances) with Q of about 15 were observed in gold-CdS-gold piezoelectric structures, deposited on thin and thick glass substrates.
AD-643 519 HC$3.00 MF$0.65

AN ELECTRO-MECHANICAL FLIP-FLOP WITH APPLICATIONS TO COUNTING, TIMING AND RANDOMIZATION,
Army Medical Research Lab., Fort Knox, Ky. Biophysics Div.
Samuel H. Revusky. 22 Aug 66, 10p
USAMRL-675
Availability: Published in Journal of the Experimental Analysis of Behavior v9 n4 p431-4 Jul 1966.

Descriptors: (*Relaxation oscillators, *Counting methods), Circuits, Electric relays, Diodes (Semiconductor), Switching circuits, Timing circuits.

A system is described by which two relays and two diodes act as a flip-flop counter when the input is the change in state of a form D contact. Applications to counting, timing and randomization are described. (Author)
AD-643 607 Not available from CFSTI.

INTEGRATED SILICON DEVICE TECHNOLOGY. VOLUME XII. MEASUREMENT TECHNIQUES.
Technical documentary rept.,
Research Triangle Inst., Durham, N. C.
B. M. Berry. Sep 66, 244p
ASD-TDR-63-316-Vol-12
Contract AF 33 (615)-1998

Descriptors: (*Integrated circuits, Silicon), (*Silicon, Semiconductor devices), Measurement, Conductivity, Oxygen, Carriers (Semiconductors), Single crystals, Optical properties, Hall effect, Crystal lattice defects, Electrical properties, Crystal structure, Oxides, Voltage, Transistors, Diodes (Semiconductor), Impurities.

Methods for determining the most common physical/electrical properties of silicon or devices made from silicon are described in this report. These measuring methods are grouped under four general headings: starting material evaluation, process parameter evaluation, device electrical evaluation, and device thermal evaluation. ASTM and other published standards are cited where applicable. For certain measurements these referenced standards are the only methods given; for others, alternative methods are also described in detail; and for still other measurements, no adequate standards exist. In the latter case the procedures given here have been developed from what seems to be common practice and sense. (Author)
AD-643 610 HC$3.00 MF$0.65

SHORTWAVE DIRECTIONAL ANTENNA FOR RANGES OF 5.5-18.5 MC,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
O. Shmidt. 8 Dec 66, 7p FTD-HT-66-536
TT-67-60195
Unedited rough draft trans. of Radio, Moscow (USSR) n5 p63 1965.

Descriptors: (*Phased arrays, High frequency), Radio broadcasting, Antenna radiation patterns, Remote control systems, USSR, East Germany.

The construction of a new 78-m high, 500-t tow-array antenna in Nauen near Berlin for 'Radio-DDR' broadcasting is briefly reported. The main lobe direction is controllable in both vertical and horizontal planes; the two arrays from a 50 degree angle. It takes six minutes to set the antenna in any specified direction by automatic, programmed control. The antenna is supplied via a coaxial aluminum waveguide which has a pulsation of 1.1, an attenuation of 0.15 db per 100m, and a frequency of 30 Mc. (Author)
AD-643 621 HC$3.00 MF$0.65

LINEAR OPTIMAL SYSTEMS WITH TIME DELAYS,
Minnesota Univ., Minneapolis. Center for Control Sciences.
D. H. Chyung, and E. Bruce Lee. 28 Feb 66, 31p
AFOSR-66-2759
Grant AF-AFOSR-571-64
Availability: Published in J. Siam Control v4 n3 p548-75 1966.

Descriptors: (*Control systems, Optimization), Linear systems, Integral equations, Functions, Set theory, Time-delay relays.

Methods are developed for selecting the best controllers subject to various limitations for systems involving time delays. The results are limited to systems describable by linear differential equations involving time delays, control parameters, and a variety of integral type criterion for optimality. (Author)
AD-643 631 Not available from CFSTI.

THEORY OF ADAPTIVE MECHANISMS.
Final rept., Jun 63-Jun 66,
Syracuse Univ. Research Inst., N. Y.
M. K. Hu, E. P. Stabler, L. F. Chang, W. S. Bennett, Jr., and R. Herman. Nov 66, 145p
RADC-TR-66-510
Contract AF 30 (602)-3197

Descriptors: (*Adaptive systems, Theory), Networks, Computer logic, Cascade structures, Statistical analysis, Equations, Sonar, Computers, Programming languages.

The term Adaptive Mechanism is viewed from the most general sense. Various specific topics studied and presented are: (1) Threshold gate network synthesis, (2) Applications of lattice theory to threshold logic, (3) Network synthesis of cascaded threshold elements, (4) A statistical study of the variations of moment invariants, (5) Iterative arrays of identical logical cells, (6) Computers and formal systems, (7) Approximate solutions of non-linear functional equations, (8) Adaptive sonar systems and parallel processing, and (9) RADICAL manual and subroutines. (Author)
AD-643 691 HC$3.00 MF$0.65

THE HARTLOBE AIRBORNE DUAL ANTENNA SYSTEM FOR IFF. PART I. MARK X (SIF) SYSTEM.
Interim rept.,
Naval Research Lab., Washington, D. C.
G. E. Hart, C. E. Quigley, and F. D. Mattison.
18 Oct 66, 34p NRL-6401

Descriptors: (*Aircraft antennas, *Identification systems), Radar antennas, Radar equipment, Airborne, Transponders, Performance (Engineering), Design, Gates (Circuits).

The experimental model (Plan 1) of the Hartlobe airborne dual antenna system for IFF which was successfully flight tested by NATC had an inherent problem caused by gain-time-control (GTC) action in the interrogator receiver. An improved model, designated Plan 2, which overcomes the GTC problem, has been developed. The GTC problem resulted from the fact that the bottom transponder was allowed to reply to all signals above its sensitivity threshold, while the top transponder was triggered only when the bottom unit did not reply. At certain aircraft aspects, the reply failed to register because of the GTC threshold. This problem was overcome by circuitry which compares the signal levels in the two receivers and directs the reply via the antenna which produced the strongest received signal. It is proposed to implement the Hartlobe system by utilizing components of the AN/APX-72 transponder or other lightweight transponder capable of easy separation into rf and video portions. (Author)
AD-643 694 HC$3.00 MF$0.65

A DOUBLE MIRROR ANTENNA WITH AUTOMATIC COMPENSATION OF THE PHASE ERRORS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. L. Ayzenberg, and L. N. Deryugin. 2 Sep 66, 5p FTD-HT-66-94
Unedited rough draft trans. of Patent (USSR) 170 556, appl. 896515/26-9, 23 Apr 64.

Descriptors: (*Antenna configurations, *Mirrors), Antennas, Design, Patents, USSR.

The object of the invention is a two-mirror antenna with automatic compensation of the phase errors, which consists of a horn exciter, a large and a small mirror, and also a system for controlling the actuators and an indication of the phase errors, is different in that to decrease the phase errors in the antenna aperture and to ensure the possibility of increasing the antenna gain, in it the small mirror is divided into separate sections that are equipped with actuators for their automatic shifting and the system of automatic phasing has a feedback circuit with respect to the phase of the high-frequency field through the space between the large and small mirrors. (Author)
AD-643 713 HC$3.00 MF$0.65

THE SENSITIVITY FUNCTION IN VARIABILITY ANALYSIS,
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Electrical Engineering.
For primary bibliographic entry see Field 12A.
AD-643 714 Not available from CFSTI.

PHASE DETECTOR WITH PULSE-WIDTH MODULATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. Yu. Vorobkevich, I. S. Danilyuk, and L. A. Sinitskii. 30 Sep 66, 15p FTD-tt-65-1538
TT-67-60255
Edited trans. of mono. Pribory Promyschlennogo Kontrolya i Sredstva Avtomatiki. Doklady i Soobscheniya n.p., 1963 p330-42.

Descriptors: (*Phase detectors, Pulse modulation), Transistors, Demodulators, USSR, Electronic switches, Performance (Engineering).

The article examines the operating principle and analyzes the properties of a phase-sensitive detector employing switches and providing proportionality of conversion with simultaneous power amplification of a variable input signal. The described detector is a second-harmonic detector. It employs double conversion of the measured signal.
AD-643 727 HC$3.00 MF$0.65

A METHOD OF SYNTHESIZING MULTITERMINAL SWITCHING CIRCUITS USING ONLY GENERALIZED NUMERATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.

Song Rei-chi. 16 Sep 66, 9p FTD-TT-65-1854
TT-67-60258
Edited trans. of Tzu Tung Hua Hsueh Pao (Chinese People's Republic), v3 n1 p41-4 1965.

Descriptors: (*Switching circuits, Synthesis), Graphics, China.
AD-643 732 HC$3.00 MF$0.65

COMPUTATIONAL ASPECTS OF THE DESIGN OF OPTIMAL DISTRIBUTED COMPONENTS.
Interim rept.,
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
H. G. Moyer, M. R. Wohlers, and R. E. Kopp.
1966, 10p RM-319J
AFOSR-66-2527
Contract AF 49 (638)-1512
Availability: Published in Electron Components Conference, Washington, D. C. p407-14 May 1966.

Descriptors: (*Electrical networks, Optimization), Theory, Design, Transmission lines, Calculus of variations.
Identifiers: Distributed components.

The application of variational techniques for numerically synthesizing optimum distributed networks is discussed. The method circumvents the normal approximation realization cycle of classical network theory and allows realistic constraints to be placed on network parameters. The designs of a lossless distributed bandpass filter and a lossy distributed dummy load or absorber are used to illustrate the techniques. (Author)
AD-643 794 Not available from CFSTI.

KU BAND SEMICONDUCTOR T-R DEVICE PRODUCTION ENGINEERING MEASURES PROGRAM.
Quarterly progress rept. no. 2, 27 Apr-27 Jul 66,
Microwave Associates, Inc., Burlington, Mass.
Paul Basken. Aug 66, 56p
Contract DA-36-039-AMC-06176 (E)
See also AD-637 607.

Descriptors: (*Limiters, Semiconductor devices), K band, Varactor diodes, Microwave equipment, Performance (Engineering), Transmitter-receivers.

The report covers the fabrication and evaluation of the first set of eight engineering model limiters. As PIN diodes were not available for the first stage, all-varactor limiters were made. Four units were constructed with no reverse bias provision, the remaining four incorporated a biasing provision which can be used by the systems designer to obtain considerably lower insertion loss. A major portion of the report is devoted to the development effort leading to the optimized biasing network. A new method to evaluate the power handling capability of varactors through monitoring of the recovery time is also presented. The yield from the fabrication of varactors for the engineering samples is discussed. (Author)
AD-643 827 HC$3.00 MF$0.65

AN EXPERIMENTAL INVESTIGATION OF DIELECTRIC COATED ANTENNAS.
Harvard Univ., Cambridge, Mass. Cruft Lab.
David Lamensdorf. Jun 66, 51p Scientific-13-Ser-3
AFCRL-66-625
Contract AF 19 (628)-2406, Grant NSF-GP-2242

Descriptors: (*Antennas, Coatings), (*Coatings, Dielectrics), Admittance, Electric currents, Measurement, Cylindrical bodies, Performance (Engineering), Propagation.

Measurements of the admittance and current distribution of a linear antenna embedded in a lossless dielectric cylinder have been carried out. The results compare well with a theory by C. Y. Ting. (Author)
AD-643 862 HC$3.00 MF$0.65

RELIABILITY OF ANALYSIS OF CIRCUIT ELEMENTS BY THE REDUNDANCY METHOD,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Chai Zhen-Ming. 3 Aug 66, 30p FTD-TT-65-1052
TT-67-60263
Edited Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v20 n8 p705-19 1964.

Descriptors: (*Circuits, *Reliability (Electronics)), (*Redundant components, Circuits), Effectiveness, Failure (Electronics), Life expectancy, China.

The effectiveness of using the redundancy method to increase the reliability of circuit elements is analyzed, taking into account the possibilities of short-circuit and open-circuit failures. Formulas and curves of reliability gain under various conditions are derived from the analysis of circuit elements of both switching and nonswitching types. The effects of failures of some of the basic elements within redundancy elements in changing the loading of other elements have also been considered. Some discussion is devoted to the average life of the redundancy element, indicating that the redundancy method is particularly suitable for long-term operation or self-adapting systems. Some design considerations for practical applications are discussed in substantial detail with illustrations. (Author)
AD-643 922 HC$3.00 MF$0.65

THE DESIGN OF THE TYPE 941-4 OPERATIONAL AMPLIFIER WITH PARALLEL CHANNELS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Mo Yi. 3 Aug 66, 22p FTD-HT-66-198
TT-67-60244
Edited trans. of Tzu Tung Hua Hsueh Pao (Chinese People's Republic) v3 n3 p142-50 1965.

Descriptors: (*Amplifiers, Design), China, Gain, Electrical networks, Performance (Engineering).

Some considerations in the design of the type 914-4 operational amplifier with parallel channels are presented, where the improvement of the output stage, the removal of the third channel and the synthesis of the compensating network are dealt with in detail. A method of analyzing the branching characteristics of operational amplifiers with parallel channels using a computation diagram is presented. Methods of using a compensating network to improve low-frequency stability and the construction and application of the computation diagram are given in the appendix. (Author)
AD-643 927 HC$3.00 MF$0.65

COST RELIABILITY FACTORS IN HYBRID CIRCUIT PACKAGING,
Rome Air Development Center, Griffiss AFB, N. Y.
John E. McCormick. Oct 66, 23p RADC-SP-66-9
Presented at annual National Electronic Packaging/Production Conference (4th), New York Coliseum, June 21, 1966.

Descriptors: (*Packaged circuits, Reliability (Electronics)), Integrated circuits, Cost effectiveness, Microminiaturization (Electronics), Substrates, Manufacturing methods, Films, Silicon, Bonding.

Factors that affect reliability, (1) materials, (2) chip mounting techniques, (3) connecting techniques; a comparative reliability rating; factors that affect cost, (1) assembly techniques, (2) alinement techniques, (3) repairability, (4) yield; comparative cost rating: hybrid packing figure of merit.
AD-643 969 HC$3.00 MF$0.65

WAVEGUIDE FREQUENCY DISCRIMINATOR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
B. Novak. 12 Sep 66, 29p FTD-HT-66-157
Unedited rough draft trans. of Slaboproudy Obzor (Czechoslovakia) v25 n6 p353-61 1964.

Descriptors: (*Discriminators, Waveguides), Voltage, Numerical analysis, Broadband, Czechoslovakia, Frequency.

The report describes a new solution of a waveguide frequency discriminator, its faulty voltage is derived from phase slides of the electromagnetic field during dissonance of impedance bound hollows. Explained is the principle of action of the discriminator, an accurate calculation of faulty voltage is carried out at dissonance of generator in the region of 3000 mc and derived were relations for a broad band discriminator. A design of the discriminator with waveguide cavity bound by the inductive slot is given. (Author)
AD-644 008 HC$3.00 MF$0.65

METHOD OF ELECTRICAL CONTROL OF THE BEAM OF AN ANTENNA ARRAY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. M. Mamaev, D. D. Korobov, and A. D. Minkin. 27 Sep 66, 6p FTD-HT-66-102
Unedited rough draft trans. of Patent (USSR) 171 034, appl. 906299/26/9, 19 Jun 64.

Descriptors: (*Phased arrays, Control systems), Commutators, Scanning, Patents, USSR.

The object of the invention is a method of electrical control of the beam of an antenna array accomplished with the aid of commutators of the phase of high-frequency radiating elements. The commutation of the radiating elements is determined through the length of the interval of commutation (switching over) which is calculated in accordance with the formula A = B - C sin alpha, where B and C are the values constant for each concrete antenna, and alpha is the declination of the cophasal front of the beam with relation to the plane of the array and the supply of the radiating elements occurs both in parallel and in sequence through a waveguide along which there are arranged the radiating elements. (Author)
AD-644 039 HC$3.00 MF$0.65

TRANSISTORIZED VOLTAGE CONVERTERS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yu. K. Zakharov. 26 Jul 66, 80p FTD-MT-65-81
TT-67-60309
Edited machine trans. of mono. Preobrazovateli Napryazheniya na Poluprovodnikovykh Triodakh, Moscow, 1964 102p.

Descriptors: (*DC to DC converters, Transistors), Circuits, Design, Failure (Electronics), USSR, Reliability (Electronics), Radio equipment.

Contents: Circuits of transistorized d-c converters and principle of their operation; Practical circuits of transistorized voltage converters and their electrical characteristics; Designing transistorized voltage converters; Adjustment of operating conditions of voltage converters and elimination of failures.
AD-644 069 HC$3.00 MF$0.65

DESIGN AND EVALUATION OF TWO-REFLECTOR ANTENNA SYSTEMS.
Final technical rept.,
Rome Air Development Center, Griffiss AFB, N. Y.

Donald A. Hildebrand. Nov 66, 69p RADC-TR-66-582
Review of program developed by TRG, Inc., under contract AF 30 (602)-2610.

Descriptors: (*Antennas, Reflectors), Design, Antenna feeds, Computer programs, Antenna radiation patterns.

The report presents the major aspects of the design of certain two-reflector antenna systems which might be employed as fractional-degree beam low-noise detection and tracking antennas. The influences of various parameters on performance are discussed, and a computer program for use in designing and evaluating such systems is presented. The program is written in the FORTRAN language and is highly efficient. An operating manual is included. The program can be used by anyone with a cursory knowledge of FORTRAN and format specifications. (Author)
AD-644 107 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE CRYSTAL UNIT CR- (XM-56)/U.
Quarterly rept. no. 2, 16 May-16 Aug 66,
Lewis (E. B.), Inc., East Hartford, Conn.
Thomas F. Davis. 16 Aug 66, 21p
Contract DA-36-039-AMC-06180 (E)
See also AD-642 148.

Descriptors: (*Crystal filters, Manufacturing methods), Very high frequency, Quartz, Design, Performance (Engineering).

Design data and fabrication technique for AT-cut quartz crystals, 70 and 80 MC/s fifth overtone for filter application is presented. An evaluation of crystal units with various plate backs vs. mode suppression for the 80 MC/s design is given. (Author)
AD-644 158 HC$3.00 MF$0.65

METHODS OF INCREASING THE ACCURACY OF CODERS BY AUTOMATIC EXCLUSION OF CODING ERRORS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
S. M. Persin. 23 Sep 66, 31p FTD-TT-65-1585 TT-67-60320
Edited trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) p14-32 (sic).

Descriptors: (*Analog-to-digital converters, *Coding), USSR, Errors, Corrections, Automatic, Contr tl systems, Telemeter systems.

The report describes the principles of new methods of increasing the accuracy of analog-digital converters based on automatic compensation of coding errors. Various methods of achieving such compensation with the insertion of a correction in digital or analog form are discussed. It is shown that it is possible to use the proposed methods for increasing the accuracy of primary measurement instruments (PMI) and, in a number of cases (particularly in employing two-stage coding) for increasing the operating speed of the converter. (Author)
AD-644 165 HC$3.00 MF$0.65

THE EFFECTS OF SPACE RADIATION ON MOSFET DEVICES AND SOME APPLICATION IMPLICATIONS OF THOSE EFFECTS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
F. Gordon, Jr., and H. E. Wannemacher, Jr., Aug 66, 36p NASA-TM-X-55597, X-716-66-347

Descriptors: *Metal oxide semiconductor (mos), *Radiation effect, *Space radiation, Component, Device, Effect, Electronic, Field, Metal, Microcircuit, Mos, Oxide, Radiation, Semiconductor, Shielding, Space, Spacecraft, Subsystem, Telemetry, Transistor.

For abstract, see STAR 05 02.
N67-11373 HC$3.00 MF$0.65

9F. TELEMETRY

A QUANTITATIVE IMPEDANCE PNEUMOGRAPH,
Naval Air Development Center, Johnsville, Pa. Aerospace Medical Research Dept.
For primary bibliographic entry see Field 6L.
AD-643 687 HC$3.00 MF$0.65

METHODS OF INCREASING THE ACCURACY OF CODERS BY AUTOMATIC EXCLUSION OF CODING ERRORS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 9E.
AD-644 165 HC$3.00 MF$0.65

A TWO-CHANNEL MONOPULSE REFLECTOR ANTENNA SYSTEM WITH A MULTIMODE LOGARITHMIC SPIRAL FEED.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
P. A. Lantz. Jun 66, 54p NASA-TM-X-55580, X-525-66-262

Descriptors: *Log spiral antenna, *Reflector, Antenna, Cavity, Channel, Feed, Log, Logarithm, Monopulse, Multimode, Pattern, Polarization, Spiral, Tiros satellite, Tracking, Two, Wave.

For abstract, see STAR 05 02.
N67-11362 HC$3.00 MF$0.65

A STATISTICAL INVESTIGATION OF THE EFFECTS CONTRIBUTED BY TAPE RECORDERS AND BY WOW AND FLUTTER OF MAGNETIC TAPE ON THE ACCURACY OF A TELEMETRY SYSTEM TECHNICAL REPORT NO. 15.
Alabama Univ., University. Systems Engineering Group.
H. M. Donaldson, M. A. Griffin, H. P. Hassell, Jr., J. H. Horn, Jr., and R. S. Simpson. Jul 66, 63p NASA-CR-79621
Contract NAS8-20172

Descriptors: *Flutter, *Magnetic tape recorder, *Telemetry, Analog, Error, Frequency, Magnetic, Noise, Recorder, Statistical, Tape, Track, Variance.

For abstract, see STAR 05 02.
N67-11690 HC$3.00 MF$0.65

SPECIAL AROD SYSTEM STUDIES, VOLUME I FIFTH QUARTERLY REPORT, PERIOD ENDING DEC. 31, 1964.
International Business Machines Corp., Rockville, Md. Federal Systems Div.
15 Jan 65, 90p NASA-CR-79751, IBM-TR-15-7, VOL. I
Contract NAS8-11050

Descriptors: *Airborne range and orbit determination (arod), *Loop, *Modulation technique, *Phase lock, Airborne, Arod, Circuit, Continuous, Control, Determination, Interference, Lock, Memory, Modulation, Noise, Orbit, Phase, Range, Signal, System, Technique, Tracking, Wave, Wideband.

For abstract, see STAR 05 02.
N67-11691 HC$3.00 MF$0.65

HIGH RESOLUTION NIGHTTIME CLOUD-COVER RADIOMETER QUARTERLY REPORT NO. 18, JAN. 1 - APR. 1, 1966.
Itt Industrial Labs., Fort Wayne, Ind.
P. Eagle, R. Harber, R. Miller, P. C. Murray, and W. H. Wallschlaeger. 28 Sep 66, 51p NASA-CR-79366, QR-18
Contract NAS5-668

Descriptors: *Measuring apparatus, *Radiometer, Apparatus, Cloud, Cover, Design, Development, Electronic, Engineering, Equipment, High resolution, Measuring, Night.

For abstract, see STAR 05 02.
N67-11700 HC$3.00 MF$0.65

ADVANCED PLANETARY PROBE STUDY. VOLUME 4 - APPENDIXES FINAL TECHNICAL REPORT.
Trw Systems, Redondo Beach, Calif.
27 Jul 66, 225p NASA-CR-79504, TRW-4547-6007-RO000
Contracts NAS7-100, JPL-951311
Prepared For Jpl

Descriptors: *Bit synchronization, *Conical scanning, *Planetary spacecraft, *Signal processing, *Spacecraft communications system, Amplifier, Analysis, Antenna, Bit, Communications, Computer, Conical, Error, Helix, Midcourse, Modulation, Noise, Perturbation, Planetary, Power, Processing, Program, Propulsion, Reliability, S-band, Scanning, Signal, Spacecraft, Synchronization, System, Temperature, Tracker, Trajectory.

For abstract, see STAR 05 02.
N67-12047 HC$3.00 MF$0.65

OBSERVATION OF THE RUSSIAN MOON PROBE " LUNA 10".
Beobachtung Der Sowjetischen Mondsonde "luna 10"
National Aeronautics And Space Administration, Washington, D. C.
H. Kaminski. Nov 66, 9p NASA-TT-F-10603
Transl. Into English From Raumfahrtforsch. (Stuttgart), No. 3, 1966

Descriptors: *Lunar probe, *Spacecraft tracking, Antenna, Doppler effect, Facility, Field, Intensity, Lunar, Parabolic, Probe, Reception, Recording, Spacecraft, Telemetry, Tracking, Transmission.

For abstract, see STAR 05 02.
N67-12151 HC$3.00 MF$0.65

PROCUREMENT, OPERATION, AND RELOCATION OF THE 16 FOOT MILLIMETER WAVELENGTH ANTENNA SYSTEM FINAL REPORT, 13 NOV. 1961 - 13 NOV. 1966.
Texas Univ., Austin. Electrical Engineering Research Lab.
C. W. Tolbert. 14 Nov 66, 7p NASA-CR-80099
Contract NASR-87

Descriptors: *Antenna, *Parabolic reflector, *Radiometer, Atmosphere, Earth, Frequency, Instrumentation, Operation, Parabolic, Propagation, Reflector, Refraction, Telescope.

For abstract, see STAR 05 02.
N67-12159 HC$3.00 MF$0.65

IONOSPHERIC EFFECTS ON 400 MC RADAR SIGNALS.
Kansas Univ., Lawrence. Center For Research Inc.
H. Unz. 1965, 27p NASA-CR-80194, CRES-61-15
Contract NSR-17-004-003

Descriptors: *Ionosphere, *Satellite-borne radar, *Signal transmission, Attenuation, Delay, Faraday rotation, Height, Polarization, Propagation, Radar, Reflection, Satellite-borne, Signal, Time, Transmission, Wave.

For abstract, see STAR 05 02.
N67-12277 HC$3.00 MF$0.65

10. ENERGY CONVERSION (NON-PROPULSIVE)

RADIATION EFFECTS ON SILVER AND ZINC BATTERY ELECTRODES. V INTERIM REPORT, APR. - JUL. 1966.
Atomics International, Canoga Park, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
R. E. Kelchner, M. M. Nicholson, and H. L.
Recht. 14 Oct 66, 26p NASA-CR-79489, AI-66-186
Contracts NAS7-100, JPL-951109
Prepared For Jpl

Descriptors: *Electrode, *Gamma radiation, *Radiation effect, *Silver-cadmium battery, *Zinc-silver oxide battery, Battery, Cadmium, Capacity, Discharge, Effect, Gamma, Hydrogen, Loss, Oxide, Oxygen, Radiation, Silver, Zinc.

For abstract, see STAR 05 02.
N67-11722 HC$3.00 MF$0.65

10A. CONVERSION TECHNIQUES

ENERGY STORAGE AND ENERGY CONVERSION THROUGH HIGH MAGNETIC FIELDS FROM SUPERCONDUCTORS,
Army Electronics Command, Fort Monmouth, N. J.
G. K. Gaule, R. G. Buser, R. L. Ross, and J. Kainz. 1966, 4p
Availability: Published in Annual Proceedings Power Sources Conference (20th), May 24, 25, 26, 1966.

Descriptors: (*Energy conversion, *Superconductors), Magnetic fields, Coils, Magnets, Energy, Storage.

The essential physical feature in the energy storage and conversion systems discussed here is the large magnetic energy provided in a moderate volume by the superconductor and its coupling to a 'load coil'. Extensive use of plastics, will be made in the construction of future models. Plastics, as insulators, are 'transparent' for transient magnetic fields. Greatly simplified explosive drives for flux displacers, and inductive storage with inductive coupling thus become possible. Plastic cryostats are also very lightweight and capable of intercepting and dampening forces acting on the solenoid. Multiple use of the available magnetic energy will be made by using the dipol field from a horizontal solenoid and a rotating flux displacer, possibly driven by a gas turbine. (Author)
AD-643 791 Not available from CFSTI.

VISUALIZATION OF TRANSITION PHENOMENA IN THE BOUNDARY LAYER ON THE BLADES OF A TURBINE CASCADE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20D.
AD-644 167 HC$3.00 MF$0.65

PARAMETRIC ANALYSIS OF RADIOISOTOPE THERMIONIC GENERATORS.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
L. S. Blair, and J. J. Ward. Nov 66, 31p NASA-TM-X-1312
Contract 120-27-06-06-22

Descriptors: *Power generator, *Thermionic conversion system, Conversion, Density, Diode, Electric, Emitter, Generator, Heat, Isotope, Output, Power, Radioactivity, Source, System, Temperature, Thermionic, Volume.

For abstract, see STAR 05 02.
N67-11326 HC$3.00 MF$0.65

EFFECTS OF HIGH-ENERGY PROTONS ON SELECTED CELLS FINAL REPORT, JUN. 1966 - AUG. 1966.
Atomics International, Canoga Park, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
R. E. Kelchner, M. M. Nicholson, and H. L.
Recht. Aug 66, 26p NASA-CR-79535, AI-66-149
Contracts NAS7-100, JPL-951648
Prepared For Jpl

Descriptors: *Nickel-cadmium battery, *Potassium hydroxide, *Proton irradiation, *Silver-cadmium battery, Aqueous, Battery, Cadmium, Cell, Discharge, Effect, Electrode, Electrolyte, Flux, Gas, High energy, Hydroxide, Irradiation, Loss, Nickel, Potassium, Proton, Silver.

For abstract, see STAR 05 02.
N67-11732 HC$3.00 MF$0.65

10B. POWER SOURCES

RADIOISOTOPE STUDY OF THE ELECTROSORPTION OF METHANOL ON FUEL CELL ELECTRODES.
Research and development rept.,
Navy Marine Engineering Lab., Annapolis, Md.
R. E. Smith, H. B. Urbach, J. H. Harrison, and N. L. Hatfield. Nov 66, 33p MEL-363/66

Descriptors: (*Fuel cells, Electrodes), (*Methanols, *Electrochemistry), Tracer studies, Platinum, Adsorption, Sulfuric acid, Films, Polyester plastics.

Radiotracer techniques were used in the study of steady-state methanol adsorption as a function of potential on platinum electrodes in normal sulfuric acid solutions at room temperatures. A new window-electrode based on the use of gold-coated polyester film was developed in order to achieve high mechanical strength and counting efficiency. The observed steady-state coverage and the approach to the steady state were profoundly affected by the electrochemical pretreatment of the electrodes just prior to measurement. A bell-shaped curve of coverage versus potential was observed with preoxidized electrodes. The potential at which maximum adsorption occurred was 0.2 volt and was independent of methanol concentration, which deviates from results reported by previous investigators. With prereduced electrodes, the bell-shaped curve of coverage versus potential was distorted at low potentials. The time required for establishing steady-state coverage depended on the potential, being as long as 40 minutes in some cases. (Author)
AD-643 529 HC$3.00 MF$0.65

DISCUSSION AT MEETING ON OPERATION TECHNIQUES OF HYDROELECTRIC STATIONS AND DESIGN OF ELECTRICAL DEVICES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
C. S. Chao. 21 Nov 66, 9p FTD-TT-65-1950
TT-67-60187
Edited trans. of K'o Hsueh Tung Pao (Chinese People's Republic) n2 p179-80 1965.

Descriptors: (*Power plants (Establishments), Operation), (*Turbines, Design), Electric power production, Electrical equipment, Symposia, China, Corrosion, Corrosive gases, Abrasives, Sand, Automation, Ventilation.
Identifiers: Hydroelectric power plants.

Four specific areas were covered: (1) Gas corrosion and soil sand abrasion of hydroelectric turbines. (2) The areas of safeguard adjustment calculations and speed adjusting systems in hydroelectric turbines. (3) The areas of the techniques of ventilation and flood prevention of hydroelectric stations. (4) The automation of hydroelectric stations and the automation and mechanization of terrace-type hydroelectric stations. (Author)
AD-643 596 HC$3.00 MF$0.65

500-WATT INDIRECT HYDROCARBON SYSTEM,
Army Electronics Command, Fort Monmouth, N. J.
Stephen J. Bartosh. 1966, 6p
Availability: Published in Annual Proceedings Power Sources Conference (20th), May 24, 25, 26, 1966.

Descriptors: (*Fuel cells, Electric power production), Hydrocarbons, Air, Hydrogen, Gas generating systems, Portable.

The technical requirements for this development program were based upon the concept that an indirect fuel cell system could be produced and operated in two separate packages of nearly equal weight and volume. This configuration would result in the highest power system which would still be portable. A hydrocarbon steam reform system was chosen for the hydrogen generator because of high conversion efficiency and the availability and low cost of the fuel. The work so far has established the feasibility of the concept. The major problems at present is to reduce the weight of each package to the desired range of 35 pounds in order to render the system truly portable. This can be done by reducing the size of a number of components, by reducing the packaging configuration and by use of lighter weight fabricating materials. Other means such as the elimination of the hydrogen purifier assembly and adapting the fuel cell battery to tolerate impure hydrogen may be considered in the next phase of the program. (Author)
AD-643 792 Not available from CFSTI.

EXPERIMENTAL EVALUATION OF MHD GENERATORS OPERATING AT HIGH HALL COEFFICIENTS,
Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
Robert R. Barthelemy, Brian G. Stephan, and Robert F. Cooper. 8 Jul 66, 8p AFAPL-CONF-67-1
Prepared for presentation at the International Symposium on Magnetohydrodynamic Power Generation Salzburg, Austria, 4-8 July 1966.

Descriptors: (*Magnetohydrodynamic generators, Operation), Design, Materials, Hall effect, Plasma medium, Gas flow, Potassium, Magnets.

A flexible, combustion-driven, MHD-generator test facility is being constructed to allow investigations of various generator operating parameters, generator configurations and designs, and component materials. The plasma source is a combustion chamber in which toluene or another suitable fuel is burned with gaseous oxygen diluted with nitrogen. Potassium hydroxide seed is injected with the fuel to produce the necessary plasma conductivity. The gas stream is accelerated in a supersonic nozzle and then flows through the Hall channel. The channel is constructed of water-cooled, Inconel rings suitably grooved for the zirconia electrode material. The magnet is an iron-core design with coils wound of hollow conductor to permit water cooling for high-power operation. The magnet has the capability of operating at field strengths to 23,000 gauss. Operation of the generator at a gas mass flow of 1.5 pounds per second, seed concentration of 0.2 mole percent potassium, channel static temperature of 2200K and pressure of 0.28 atmospheres, field strength of 15 kilogauss, Mach

number of 2.5, and a Hall coefficient of 3.4 will be investigated initially. (Author)
AD-643 831 HC$3.00 MF$0.65

OPTIMUM MAGNETS FOR MHD GENERATORS.
Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
Robert R. Barthelemy, and Charles E. Oberly. 8 Jul 66, 20p AFAPL-CONF-67-2
Prepared for presentation at the International Symposium on Generation 4-8 July, 1966, Saltzburg, Austria.

Descriptors: (*Magnetohydrodynamic generators, Magnets), (*Magnets, Selection), Electromagnets, Cooling, Cryogenics, Superconductors, Optimization, Aluminum, Weight, Costs, Design.

The purpose of this study is to define the areas of applicability for permanent, conventionally cooled resistive, cryogenically cooled resistive, and superconductive magnets to open cycle MHD power generation systems. The selection of magnet types for stationary and mobile systems as well as for short and long duration systems is made. The results of the investigation are presented in summary form for three types of MHD generators. These results are plotted on power duration and net power output coordinates to show the economical operating regimes of the various types of magnets. Both a weight and cost optimum regime are shown for the entire MHD generator operating range. The most significant result of the analysis is that high-purity aluminum magnets cooled with liquid hydrogen exhibit a wide range of application from both a cost and weight standpoint. (Author)
AD-643 832 HC$3.00 MF$0.65

EXPERIENCE IN INVESTIGATION OF COMPONENTS OF ALKALI-METAL-VAPOR SPACE POWER SYSTEMS.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
R. E. English, and R. N. Weltmann. 1966, 22p NASA-TM-X-52249
Presented At The Symp. On Alkali Metal Coolants - Corrosion Studies And System Operating Experience, Vienna, 28 Nov. - 2 Dec. 1966, Sponsored By Intern. Atomic Energy Agency

Descriptors: *Power reactor, *Turbogenerator, Alkali, Boiling, Heat transfer, Loop, Metal, Metal vapor, Potassium, Power, Pressure, Pump, Reactor, Sodium, Space, System, Vapor.

For abstract, see STAR 05 02.
N67-11332 HC$3.00 MF$0.65

GENERAL METHOD FOR PREDICTING EFFICIENCY OF PARABOLOIDAL SOLAR COLLECTOR.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
G. N. Kaykaty. Dec 66, 38p NASA-TM-X-1323
Contract 120-33-05-02-22

Descriptors: *Performance prediction, *Solar collector, *Thermodynamic efficiency, Analysis, Cavity, Collection, Collector, Distribution, Efficiency, Error, Focus, Maximum, Method, Paraboloid, Performance, Prediction, Receiver, Solar, Surface, Thermodynamic.

For abstract, see STAR 05 02.
N67-11945 HC$3.00 MF$0.65

THERMAL-ENERGY-STORAGE SUPPORTING RESEARCH FINAL TECHNICAL REPORT, APR. 1, 1965 - SEP. 30, 1966.
Battelle Memorial Inst., Columbus, Ohio.
D. P. Moak. 30 Sep 66, 300p NASA-CR-80058
Contracts NAS7-100, JPL-950978

Descriptors: *Spacecraft power supply, *Thermal energy storage, *Thermophysical property, Aluminum, Beryllium, Compatibility, Conductivity, Design, Energy, Enthalpy, Environment, Expansion, Fusion, Heat, Heat transfer, Magnesium, Material, Oxide, Power, Property, Spacecraft, Stability, Storage, Supply, Thermal, Thermionic, Thermophysical.

For abstract, see STAR 05 02.
N67-12043 HC$3.00 MF$0.65

SOLAR THERMIONIC GENERATOR DEVELOPMENT QUARTERLY REPORT, 1 JUN. - 3 SEP. 1966.
Thermo Electron Engineering Corp., Waltham, Mass.
Sep 66, 50p NASA-CR-80135, TE-20-67
Contracts NAS7-100, JPL-951263
Prepared For Jpl

Descriptors: *Solar converter, *Thermionic converter, Carbide, Chromium, Coating, Converter, Cycle, Emitter, Fabrication, Performance, Radiator, Solar, Test, Thermal, Thermionic, Zirconium.

For abstract, see STAR 05 02.
N67-12169 HC$3.00 MF$0.65

NONDISSIPATIVE SOLAR ARRAY OPTIMUM CHARGE REGULATOR FINAL REPORT.
Hughes Aircraft Co., Culver City, Calif. Research And Development Div.
Jul 66, 96p NASA-CR-79093, P66-181
Contract NAS5-9210

Descriptors: *Battery, *Spacecraft power supply, *Voltage regulator, Array, Charge, Circuit, Coupling, Design, Evaluation, Optimum, Power, Regulator, Solar, Spacecraft, Supply, Switching, Transfer, Voltage.

For abstract, see STAR 05 02.
N67-12215 HC$3.00 MF$0.65

10C. ENERGY STORAGE

HIGH-CAPACITY MAGNESIUM BATTERIES.
Final rept. no. 10, 1 Jun 60-30 Nov 62,
Radio Corp. of America, Somerville, N. J. Semiconductor and Materials Div.
R. J. Ryan, and T. R. Krebs. 30 Nov 62, 216p
Contract DA 36-039-sc-85340

Descriptors: (*Dry cells, Low-temperature research), (*Meteorological batteries, Magnesium), (*Low-temperature batteries, Copper compounds), (*Primary cells, Voltage), Oxides, Cathodes (Electrolytic cell), Mercury compounds, Additives, Control, Storage, Polarization, Dioxides, Manganese compounds, Anodes (Electrolytic cell), Corrosion, Films, Electrical conductance, Viscosity, Containers, Seals, Electrical impedance, Equations, Effectiveness, Tables, Magnesium compounds, Design, Perchlorates, Electrolytes, Heat sinks.

Characteristic data are presented for magnesium/magnesium-perchlorate reserve cells discharged at temperatures as low as -40 F. Cathode efficiency data as a function of temperature and current drain are also presented. Factors affecting the performance of dry cell batteries were investigated. Cathode efficiencies, storage-characteristics, and electrode surface phenomena were evaluated. Data are also presented for a newly-developed magnesium/mercuric-oxide meteorological battery, including discharge data for temperatures as low as -58 F. (Author)
AD-404 861 HC$3.00

NEW MAGNESIUM ANODE STRUCTURE.
Semiannual rept. no. 1, 1 Mar-31 Aug 66,
Battery Corp. of America, Fort Lauderdale, Fla.
Rodolfo R. Balaguer. Nov 66, 55p Rept. no. 6 ECOM-01998-1
Contract DA-28-043-AMC-01998 (E)

Descriptors: (*Anodes (Electrolytic cell), Magnesium), (*Dry cells, Batteries + components), Primary cells, Binders, Thermosetting plastics, Containers, Storage, Packaging.

The basic 'D' cell made on this contract has the same construction as that developed on previous contracts except for an improved carbon cup which utilizes a thermosetting resin binder instead of the coal tar pitch formerly used. Eleven experimental lots have been made and put on test to evaluate various materials for the cell jacket, the anode sealing washer and the insulating and reinforcing tape. At this time, no definite differences in performance have been observed between cells using different materials of construction. Capacity maintenance at 130F has been over 90 percent at up to three months. Uniformity has been good. The feasibility of making a 'C' cell has been demonstrated and work is under way on equipment to make this size cell using the same design and materials of construction as are used in the 'D' cell. (Author)
AD-643 545 HC$3.00 MF$0.65

MICROGRAPHY OF TUBULAR-TYPE BATTERY PLATES.
Final rept.,
Naval Research Lab., Washington, D. C.
A. C. Simon. 3 Oct 66, 29p NRL-6428

Descriptors: (*Batteries + components, *Microanalysis), Storage batteries, Anodes (Electrolytic cell), Microstructure.

Tubular type battery plates of various stages of production were obtained from three battery manufacturers and examined microscopically. It was ascertained that certain physical changes took place in the microstructure of the material after soaking in acid and after forming. These changes were not the same as those that occurred when plates were prepared from mixed and cured paste and subsequently formed. To all visible appearances the product from the tubular plate appeared to have cohesion and porosity equal to or better than from most pasted plates. However, the adherence of the paste to the metal spline was poor. Of particular interest was the discovery that the formed active material of one of these manufacturers contained a definite reticulate structure such as had previously been found to coexist with plates that successfully floated without loss of capacity. (Author)
AD-643 750 HC$3.00 MF$0.65

NICKEL-CADMIUM BATTERIES. 4. SELF DISCHARGE ON Ni (OH)2 ELECTRODES.
Army Electronics Command, Fort Monmouth, N. J.
Benjamin C. Bradshaw. 1966, 5p
Availability: Published in Annual Proceedings Power Sources Conference (20th), May 24, 25, 26, 1966.

Descriptors: (*Storage batteries, Nickel), (*Cadmium, Storage batteries), Electrodes, Oxides, Dry cells, Oxygen, Electrons, Batteries + components, Power supplies, Power equipment.

The four methods that were developed, and tested, for the nickel-cadmium cell are: 1. Measure the volumes of oxygen that are spontaneously evolved as a function of the time and the temperature. 2. Measure the electromotive force of the cell on open circuit as a function of the time and the temperature. 3. Measure the electromotive force of the cell on open circuit as a function of the volumes of oxygen that are spontaneously evolved, and the temperature. 4. Measure the electromotive force and the number of electrons that are added

to, or taken from, the nickel oxide electrode and the temperature.
AD-643 798 Not available from CFSTI.

HIGH ENERGY SYSTEM (ORGANIC ELECTROLYTE).
Quarterly rept. no. 1, 15 Jun-15 Sep 66,
Electric Storage Battery Co., Yardley, Pa. Carl F. Norberg Research Center.
D. P. Boden, H. R. Buhner, and V. J. Spera. Dec 66, 97p Rept. no. 5
ECOM-02304-1
Contract DA-28-043-AMC-02304 (E)

Descriptors: (*Cathodes (Electrolytic cell), Electrochemistry), (*Electrolytes, Organic compounds), (*Storage batteries, Performance (Engineering)), Batteries + components, Copper compounds, Fluorides, Silver compounds, Oxides, Polarization, Lithium compounds, Statistical analysis.

A screening program was carried out to investigate the electrochemical behaviour of several organic and inorganic cathodes when discharged in non-aqueous electrolytes. The majority of the materials discharged only poorly with the exception of AgO, bis-benzo furoxane sulphone and m-dinitrobenzene. These compounds gave results warranting further study. Statistical analysis of the preparative variables of the silver oxide cathode revealed that optimum performance is achieved with a cathode containing no binder or conducting additive. A Latin Square analysis of the floc method of preparing CuF2 cathodes revealed that the performance was in general lower than the hot pressed types. Promising results were obtained from hot pressed CuF2 electrodes discharged in 2F LiC104/Dimethyl carbonate. When discharged at 7 ma/sq cm the cathodes gave 60% coulombic efficiency compared to 60% utilization at 2 ma/sq cm in 1F LiC104/P.C. Solubility studies of CuF2 in solutions of LiC104 in propylene carbonate have shown that a major cause of the dissolution of CuF2 is the impurities in the LiC104. (Author)
AD-643 935 HC$3.00 MF$0.65

SOME FACTORS TO CONSIDER IN DETERMINING THE CAPACITY OF A NICKEL CADMIUM CELL.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
G. Halpert. Aug 66, 9p NASA-TM-X-55610, X-735-66-275

Descriptors: *Charge, *Nickel-cadmium battery, Battery, Cadmium, Capacity, Conditioning, Cycling, Discharge, History, Nickel, Resistor, Voltage.

For abstract, see STAR 05 02.
N67-11393 HC$3.00 MF$0.65

STUDIES OF REACTION GEOMETRY IN OXIDATION AND REDUCTION OF THE ALKALINE SILVER ELECTRODE QUARTERLY REPORT.
Brigham Young Univ., Provo, Utah. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
A. V. Blackham, and E. A. Butler. 9 Jul 66, 20p
NASA-CR-80126, QR-1
Contracts NAS7-100, JPL-951554
Prepared For Jpl

Descriptors: *Chemical reaction, *Electrochemical oxidation, *Electrode, Alkali, Chemical, Chromatography, Deposition, Device, Difference, Electrochemical, Evaporation, Gas, Geometry, Measurement, Oxidation, Potential, Reaction, Reduction, Silver, Surface.

For abstract, see STAR 05 02.
N67-12175 HC$3.00 MF$0.65

IMPROVED SEPARATORS FOR SILVER OXIDE-ZINC AND SILVER OXIDE-CADMIUM CELLS FOR SPACECRAFT APPLICATION FINAL REPORT, NOV. 10, 1964 - NOV. 10, 1965.
Borden Chemical Co., Philadelphia, Pa. Central Research Lab.
H. E. Hoyt, and H. L. Pfluger. 10 Nov 65, 60p
NASA-CR-80108
Contract NAS5-9107

Descriptors: *Separator, *Silver-cadmium battery, *Silver-zinc battery, Application, Battery, Cadmium, Cell, Concentration, Graph, Improvement, Ion, Oxide, Permeability, Silver oxide, Spacecraft, Zinc.

For abstract, see STAR 05 02.
N67-12244 HC$3.00 MF$0.65

11. MATERIALS

11A. ADHESIVES AND SEALS

A METHOD OF PRODUCING A HEAT-RESISTANT HERMETIC SEALER BASED ON FLUORINE-RUBBER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. G. Fedorova, and V. B. Stepanova. 2 Sep 66, 5p FTD-HT-66-88
Unedited rough draft trans. of Patent (USSR) 167 926, appl. 759814/23/4, 12 Jan 62.

Descriptors: (*Hermetic seals, *Synthetic rubber), Calcium compounds, Fluorides, Aluminum, Powder metals, Zinc compounds, Cyclohexanones, Heat-resistant materials, Patents, USSR.

The object of the invention is a method of producing a heat-resistant hermetic sealer based on fluorine-rubber, fillers and solvents. To increase the quality of the hermetic sealer, 160 parts by weight of fluorine-rubber (SKF-26), 45 parts by weight of calcium fluoride, 5 parts by weight of aluminum powder and 10 parts by weight of zinc oxide are mixed and dissolved in cyclohexanone to the required consistency. (Author)
AD-644 038 HC$3.00 MF$0.65

11B. CERAMICS, REFRACTORIES, AND GLASSES

EFFECT OF WATER VAPOR ON DIELECTRIC LOSS IN MgO.
Utah Univ., Salt Lake City. Dept. of Ceramic Engineering.
For primary bibliographic entry see Field 20C.
AD-643 464 Not available from CFSTI.

DIPOLE RELAXATION IN CaF2 DOPED WITH NaF.
Utah Univ., Salt Lake City. Dept. of Ceramic Engineering.
For primary bibliographic entry see Field 20C.
AD-643 465 Not available from CFSTI.

SCATTERED RADIATION (SKYSHINE) CONTRIBUTION TO AN OPEN BASEMENT LOCATED IN A SIMULATED FALLOUT FIELD.
Army Nuclear Defense Lab., Edgewood Arsenal, Md.
For primary bibliographic entry see Field 13L.
AD-643 538 HC$3.00 MF$0.65

PERCUSSIVE (SHOCK) COMPRESSION OF QUARTZ,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20K.
AD-643 598 HC$3.00 MF$0.65

GLASS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. V. Vargin, T. I. Veinberg, and S. A. Stepanov. 12 Sep 66, 4p FTD-HT-66-108
Unedited rough draft trans. of Patent (USSR) 174 777, appl. 915196/29-14, 3 Aug 64.

Descriptors: (*Glass, Polarization), Magnetic properties, USSR, Patents, Silicon compounds, Oxides, Boron compounds, Zinc compounds, Cadmium compounds, Barium compounds, Rotation, Terbium, Magnetic fields.

The object of the invention is a glass based on SiO2, B2O3, ZnO2, CdO and BaO is different in that, to give it the property of rotating the plane of polarization of light in a magnetic field, the stated components enter its composition in the following molar percents: SiO2, 20 - 35; B2O3, 20 - 40; ZnO, up to 10; CdO, up to 10; BaO, up to 20; and, furthermore, 10 -32.5% of Tb2O3 is also inserted. (Author)
AD-643 737 HC$3.00 MF$0.65

ATTENUATION OF NITROGEN-CAPTURE GAMMA RAYS IN CONCRETE,
Virginia Univ., Charlottesville.
For primary bibliographic entry see Field 18F.
AD-643 754 HC$3.00 MF$0.65

SYNTHESIS OF NEW SOLID-STATE MATERIALS BY ULTRAHIGH PRESSURE TECHNIQUES.
Final rept., 14 May 63-14 Oct 66,
Avco Corp., Wilmington, Mass. Avco Space Systems Div.
A. Joseph DeLai, Robert M. Haag, and Thomas Vasilos. 20 Dec 66, 104p AVSSD-0314-66-RR
AFCRL-66-737
Contract AF 19 (628)-2943

Descriptors: (*Ceramic materials, Preparation), (*High-pressure research, Ceramic materials), (*Oxides, High-pressure research), (*Halides, High-pressure research), Microstructure, Physical properties, Magnesium oxides, Hardness, Samarium compounds, Phase studies, Rubidium compounds, Chlorides, Bromides, Compressive properties, Presses (Machinery), X-ray diffraction analysis, Nickel compounds, Chromium compounds, Alumina.
Identifiers: Chromic oxide, Nickelous oxide, Rubidium bromide, Rubidium chloride, Samarium oxides, Samarium oxyhydroxide.

The microstructure and physical properties of dense oxides prepared at ultrahigh pressure and low temperature were studied. Completely dense, transparent magnesium oxide was prepared in submicron grain sizes with hardness values twice that of single crystal material and 30 percent to 50 percent greater than that of hot pressed material. A new modification of samarium oxyhydroxide was found and characterized. X-ray determinations on the compressibility of alkali halides, RbCl, RbBr, are reported. (Author)
AD-643 861 HC$3.00 MF$0.65

EFFECT OF GAMMA RADIATION ON THE DIELECTRIC PROPERTIES OF VACUUM DENSE CERAMICS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
B. I. Vorozhtsov, and I. S. Filatov. 24 Aug 66, 12p FTD-HT-66-37
TT-67-60242
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR) n3 p7-11 1964.

Descriptors: (*Ceramic materials, Radiation damage), Gamma rays, Dielectric properties, USSR.

Conclusions: (1) A notable change in the properties of ceramics both after the action of gamma rays and at the moment of radiation by gamma rays in a weak field brought about by the breakdown in the structure of the material through the effect of the glass phase with the formation of centers of coloration is possible only through radiation with a powerful dose (greater than 1,000,000 r). In this situation the relaxation losses decrease and the losses in conductivity somewhat increase. (2) In the area of powerful fields at the moment of radiation with gamma rays even an insignificant dose of radiation 2.25. 10,000 r) leads to a sharp increase in epsilon and tg delta on account of the strong dependence of the processes of ionization of the gas in the pores of the material in a high-frequency electrical field on the action of an outside ionizer. (Author)
AD-643 924 HC$3.00 MF$0.65

OPTICAL BORIC GLASS WITH HIGH REFRACTION INDEX,
Institute of Modern Language, Washington, D. C.
Werner Vogel, and Wolfgang Heindorf. Dec 66, 7p
AERDL-T-1880-66
Contract DA-44-009-AMC-1563 (T)
Trans. of Opticke Borite Sklo S Vysokou Lomivosti, Patent (Czechoslavakia) 112 797 PT-32-b, 3/14, 1964.

Descriptors: (*Optical glass, Boron compounds), Refractive index, Czechoslovakia, Patents, Oxides, Lanthanum compounds, Titanium compounds, Tantalum compounds, Niobium compounds, Tungsten compounds, Alkali metal compounds, Alkaline earth compounds, Lead compounds, Arsenic compounds.

The object of this invention are boric glasses with high refraction index and medium dispersion, the optical qualities of which indicated in diagram vd-nd lie in the fields where until now only a few technically usable glasses have been known.
AD-644 150 HC$3.00 MF$0.65

11C. COATINGS, COLORANTS, AND FINISHES

ADHESION AND THERMAL PROPERTIES OF REFRACTORY COATING-METAL SUBSTRATE SYSTEMS.
Technical rept.,
Army Materials Research Agency, Watertown, Mass. Materials Engineering Div.
Milton Levy, Gilbert N. Sklover, and David J. Sellers.Jan 66, 28p
AMRA-TR-66-01

Descriptors: (*Refractory coatings, *Finishes + Finishing), Protective treatments, Ceramic coatings, Coatings, Flame spraying, Environmental tests, Metal coatings, Test methods, Emissivity, Adhesion, Thermal stresses, X-ray diffraction analysis, Oxygen, Alkynes, Arc melting, Plasma jets.

The U. S. Army Materials Research Agency program for evaluating the adhesion of oxyacetylene- and arc-plasma-sprayed metal, ceramic, and cermet coatings to various substrate metals. Their resistance to thermal shock, and their drop or insulative properties is described in detail. Adhesion, thermal shock and drop data, and emittance values for these coating substrate systems are presented and evaluated along with x-ray diffraction analyses of coating materials before and after deposition. (Author)
AD-482 760 HC$3.00 MF$0.65

PROTECTION OF METALS WITH RUBBER COATINGS AGAINST CAVITATIONAL WEAR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. M. Konovalov, and K. N. Shabalin. 7 Oct 66, 9p FTD-HT-66-510
TT-67-60259
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Mashinostroenie (USSR) n9 p86-9 1965.

Descriptors: (*Rubber coatings, Wear resistance), USSR, Cavitation, Metals, Effectiveness, Damping.

The protective ability of rubber coatings against cavitational wear was investigated by two methods: movable and stationary sample. The tests showed that soft rubber coatings provide the best protection. Soft rubber coatings are especially effective in the protection of details, the natural movement and vibration of which in a liquid cause their cavitational wear.
AD-643 734 HC$3.00 MF$0.65

FOURTH-YEAR LABORATORY AND FIELD INSPECTION OF EXPERIMENTAL PROTECTIVE LININGS, SOUTHSIDE CANAL -- COLLBRAN PROJECT, COLORADO,
Bureau of Reclamation, Denver, Colo. Chemical Engineering Branch.
J. L. Kiewit, and H. K. Uyeda. 30 Jun 66, 85p
ChE-58

Descriptors: (*Moistureproofing, *Paints), Pipes, Inland waterways, Environmental tests, Colorado, Erosion, Plastic coatings.
Identifiers: Collbran project.

Protective linings were applied during 1959 to the interior of a 270-ft length of 6-ft-dia siphon piping on the Collbran Project, Colorado. The purpose was to test the fresh water immersion resistance of 36 coating systems selected from the most promising materials earlier tested in the Bureau's Denver laboratories. Companion coating panels were placed in the laboratory immersion test. Coatings tested included many 2-component materials and several zinc or zinc-containing linings. After 4 years' exposure, 25 of the 36 field systems remained in Class A (defect-free condition). Eight were in Class B; 2 in Class C; and 1 in Class D (failing). At 60 months, the laboratory panels included 21 in Class A, 10 in Class B, and 5 in Class C. Correlation between field and laboratory was considered satisfactory. Invert surfaces of many test coatings had been damaged in what can be described as the 'mild' erosion exposure of the siphon piping. Erosion resistance ratings, given during the fourth year of inspection, placed 15 coatings systems in Class A, 7 in Class B, 12 in Class C, and 2 in Class D. Coal-tar enamel near the test section in the siphon was in excellent condition. (Author)
PB-173 626 HC$3.00 MF$0.65

11D. COMPOSITE MATERIALS

DEVELOPMENT OF COMPOSITE STRUCTURAL MATERIALS FOR HIGH TEMPERATURE APPLICATIONS.
Quarterly rept. no. 2, 23 Feb-22 May 66,
General Electric Co., Philadelphia, Pa. Missile and Space Div.
J. Chorne, C. A. Bruch, and W. H. Sutton. 22 May 66, 59p
Contract NOw-66-0443

Descriptors: (*Composite materials, *Heat-resistant metals + alloys), (*Aluminum, *Single crystals), Crystal growth, Whiskers (Crystals), Temperature, Tensile properties, Ductility, Electroplating, Embrittlement, Bonding, Oxides, Reinforcing materials, Filaments, Nickel, Feasibility studies, Crystal lattice defects, Heat treatment.

The purpose of this program is the development of new structural composite materials with high strength-to-weight ratios at elevated temperatures. The current effort is being directed towards the reinforcement of nickel by using ultra-high strength AL203 single crystal whiskers. The major emphasis was placed on the fabrication and testing of experimental NI-AL203 whisker composites prepared by electrodeposition and pressure bonding techniques. Substantial progress was made in the whisker growth area. Experiments utilizing in air elutriation technique have demonstrated good potential for beneficiating, classifying and orienting the type of alumina whiskers grown at this laboratory. Studies of electroplated nickel show that it is subject to embrittlement when heated to the temperature range of 800 to 1000 C. Electro formed bundles of whiskers were pressure bonded at higher temperatures than previously used.
AD-489 216 HC$3.00 MF$0.65

AN IMPROVED METHOD FOR PREDICTING MECHANICAL PROPERTIES OF FIBRE COMPOSITE MATERIALS.
Technical rept.,
Royal Aircraft Establishment, Farnborough (England).
P. H. H. Bishop. Aug 66, 35p TR-66245

Descriptors: (*Composite materials, Mechanical properties), Mathematical models, Mathematical prediction, Glass textiles, Plastics, Epoxy plastics, Laminated plastics, Pressure vessels, Great Britain.

A mathematical model is presented which enables the mechanical properties of fibre/resin composites to be calculated with improved accuracy. The model is based on the standard netting analysis, but the indirect contributions of the fibre have been allowed for mathematically by introducing two hypothetical 'lateral fibres'. The model has been used to analyse stiffness and strength data for glass-fibre/epoxide-resin laminates, and to predict the behaviour of a glass-fibre pressure vessel under simultaneous bending and internal pressure. Data predicted by the model did not differ from observed data by more than plus or minus 17 per cent. The behaviour of the pressure vessel was predicted satisfactorily. (Author)
AD-643 546 HC$3.00 MF$0.65

THEORETICAL ANALYSIS OF UNSTEADY HEATING AND DESTRUCTION OF A GLASS PLASTIC IN THE REGION OF THE STAGNATION POINT,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yu. V. Polezhaev. 2 Sep 66, 15p FTD-HT-66-279
TT-67-60252
Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya: Mekhanika i Mashinostroenie n3 p3-8 1964.

Descriptors: (*Reinforced plastics, *Ablation), Glass textiles, Binders, Thermal expansion, Pyrolysis, Stagnation point, Aerodynamic heating, Analysis, Theory, USSR.

A schematic model of unsteady destruction of a complex glass-like material consisting of glass fiber (filler) and an organic binder is proposed. The process of thermal expansion of the binder is calculated taking into account the kinetics of the chemical reaction. The interaction of the processes of fusion and coking is analyzed and the effect of separate thermophysical parameters on the surface temperature and the rate of mass removal from the heat-insulating material is shown. A typical glass-plastic is composed of glass fiber cemented together by an organic resin. The process of unsteady destruction of such a material in a high-temperature flow of gas includes: in a certain temperature range the formation of a zone of thermal expansion (coking) of the organic binder, filtration

of the gaseous products of coking through the porous remainder, and gradual softening of this remainder with the formation of a liquid film of melt. (Author)
AD-643 733 HC$3.00 MF$0.65

MICROMECHANICAL BEHAVIOR OF FIBER REINFORCED PLASTICS.
Whittaker Corp., San Diego, Calif. Narmco Research and Development Div.
For primary bibliographic entry see Field 11I.
AD-643 813 HC$3.00 MF$0.65

11E. FIBERS AND TEXTILES

A METHOD OF THERMOSTABILIZATION OF POLYAMIDE FIBER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. I. Kudryavtsev, and V. N. Odnoralova. 2 Sep 66, 6p FTD-HT-66-89
Unedited rough draft trans. of Patent (USSR) 167 952, appl. 894503/23-5, 11 Apr 64.

Descriptors: (*Fibers (Synthetic), Thermal stability), (*Polyamide plastics, Thermal stability), (*Nylon, Thermal stability), Heat-resistant materials, Copolymerization, Preparation, Amides, Acids, Formamides, Calcium compounds, Copper compounds, Acetates, Patents, USSR.
Identifiers: Formyl amidoacrylic acids, Graft polymers.

The invention involves the stabilization of polyamide (nylon) fibers to high temperatures by grafting N-formyl amidoacrylic acid to the fibers, and by subsequently treating the grafted fibers with copper or calcium acetate.
AD-643 899 HC$3.00 MF$0.65

11F. METALLURGY AND METALLOGRAPHY

HEMISPHERICAL REFLECTANCE OF METAL SURFACES AS A FUNCTION OF WAVELENGTH AND SURFACE ROUGHNESS.
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
For primary bibliographic entry see Field 20F.
AD-672 707 HC$3.00 MF$0.65

DEVELOPMENT OF OXIDATION-RESISTANT HAFNIUM ALLOYS.
Final rept. 15 Jun 65-15 Apr 66,
IIT Research Inst., Chicago, Ill. Technology Center.
29 Jul 66, 53p IITRI-B6040-6
Contract NOw-65-0301

Descriptors: (*Hafnium alloys, Corrosion resistance), High-temperature research, Tantalum alloys, Niobium alloys, Oxidation, Thermal shock, Microstructure, Chromium alloys, Aluminum alloys.

The objective of this program was the development of hafnium alloys that would be employed in oxidizing environments at temperatures of 2200 to 3000 F. Wide compositional ranges were investigated in the HF-TA and HF-CB systems with ternary additions. Emphasis has been on the study of oxidation resistance; alloys developed to date are fabricable but, as expected, are weak at 2500 F. Interesting hafnium alloys have been defined that oxidize slowly in static air at 2500 F and below and are thermal shock-resistant. Compositions, such as HF-25 W/O TA above 3 W/O CR OR 1 W/O or 1 W/O AL, exhibit a weight gain of 1 MG/SQ CM/HR in 100 HR at 2500 F. This exposure leads to a growth in the range of 6 to 10 Mils per side which is associated with the formation of scale and subscale layers. (Author)
AD-489 213 HC$3.00 MF$0.65

THERMOELECTRIC AND ELECTRICAL MEASUREMENTS IN THE ERBIUM-TELLURIUM SYSTEM.
Interim rept.,
Texas Univ., Austin. Dept. of Chemical Engineering.
D. J. Haase, and H. Steinfink. 24 Jan 66, 4p
AFOSR-66-2028
Grant AF-AFOSR-62-237
Availability: Published in Journal of Applied Physics v37 n6 p2246-8 May 1966.

Descriptors: (*Thermoelectricity, *Erbium compounds), (*Tellurium alloys, Erbium), Electrical conductance, Intermetallic compounds, Phase studies, Solid solutions, Carriers (Semiconductors), Band theory of solids.
Identifiers: Erbium telluride.

Electrical conductivity and thermoelectric measurements of the intermediate phases in the Er-Te system over the temperature range 170K to 850K show that in the intrinsic region the concentration of erbium atoms in the solid solution series Er2Te3-ErTe is directly related to the number of carriers present. The erbium atoms act as impurity donors in the extrinsic region as their concentration increases from the terminal composition Er2Te3, which is p type, to ErTe which is n type. (Author)
AD-643 467 Not available from CFSTI.

VISUAL OBSERVATIONS OF CORROSION OF MATERIALS ON STU I-1 AFTER 1064 DAYS OF EXPOSURE AT A DEPTH OF 5300 FEET IN THE PACIFIC OCEAN.
Technical note,
Naval Civil Engineering Lab., Port Hueneme, Calif.
Fred M. Reinhart. Nov 65, 50p NCEL-TN-793

Descriptors: (*Corrosion, Visual inspection), (*Environmental tests, Corrosion), Ocean bottom, Sea water, Pacific Ocean, Stainless steel, Aluminum alloys, Nickel alloys, Copper alloys, Mechanical properties, Wood, Plastics, Fouling.

Visual observations of materials exposed on the bottom of the Pacific Ocean at a depth of 5300 feet for 1064 days showed that the corrosion of most of the alloys in the mud was different from the corrosion in the water 6 feet to 10 feet above the bottom. The stainless steels exhibited a honeycomb type of attack very similar to the type of attack by stagnant surface sea water. The 5000 series aluminum alloys showed deep pitting; this could be explained on the basis of the low oxygen content combined with the nearly stagnant condition of the sea water. The 70% Ni-30% Cu alloy which was partially embedded in the sediment showed pitting that undoubtedly was caused by the composition of the peculiar environment in the water-sediment interfacial zone. The plastic materials were unaffected except those portions encased in wood which were attacked by wood boring animals. Hydroids attached themselves to and grew on both metallic and nonmetallic materials with no apparent deteriorative effects.
AD-643 490 HC$3.00 MF$0.65

HYDROGEN PERMEATION MEASUREMENTS ON SOME ELECTRODEPOSITED PROTECTIVE COATINGS FOR HIGH STRENGTH STEELS.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 13H.
AD-643 535 HC$3.00 MF$0.65

SOME FACTORS AFFECTING THE METALLURGICAL MICROSTRUCTURE AND CREEP PROPERTIES OF THE TITANIUM 3 Al 6 Sn 5 Zr 0.5 Si TYPE OF ALLOY,
Aeon Labs., Egham (England).
C. R. Mayo, Patricia A. Dow, W. K. Armitage, and M. A. P. Dewey. Jul 66, 26p
MA-S/T Memo-8/66

Descriptors: (*Titanium alloys, Chemical analysis), Microstructure, Creep, Silicon alloys, Aluminum alloys, Tin alloys, Zirconium alloys, Heat treatment, Grain structures (Metallurgy).

Optical and electron metallographic techniques have been used to study the microstructure of Titanium 3Al 6Sn 5Zr 0.5 Si type alloy (Hylite 55) and Titanium 3Al 6Sn 5Zr 2 Mo 0.5 Si type alloy (Hylite 60) containing 0.005 wt %, 0.42 wt % and 0.75 wt % Si after beta annealing treatments at 1000 deg.C, followed by either air cooling or water quenching from room temperature and then ageing for 24 hrs at 500 deg.C. The creep properties of these alloys have been determined by testing at 500 deg.C. and 18 tsi for approximately 1000 hours.
AD-643 539 HC$3.00 MF$0.65

FERROMAGNETISM IN DILUTE ALLOYS,
Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.
For primary bibliographic entry see Field 20C.
AD-643 551 Not available from CFSTI.

FIRST IN THE USSR.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
8 Dec 66, 7p FTD-HT-66-525
TT-67-60196
Pervaya v SSSR, unedited rough draft trans. of Vystavka Dostizhenii Narodnogo Khozyaistva SSR. Informatsionnyi Byulleten, n7 p16 1965.

Descriptors: (*Castings, Induction heating), (*Metal-forming presses, Castings), Resistance (Electrical), Furnaces, Scale, Wastes (Industrial), Metals.

The article describes the use of the first induction furnace and electric resistance furnace in the USSR at the Ivl'chagorsk plant for nonferrous metals. The inductor construction was changed with an improvement in production and a waste reduction. High frequency generators were no longer needed.
AD-643 626 HC$3.00 MF$0.65

THE OXIDATION OF METALS.
Technical rept.,
Virginia Univ., Charlottesville. Dept. of Materials Science.
Kenneth R. Lawless. Oct 66, 73p MS-3531-103-66U
Contract Nonr-474 (11)
Availability: Published in Energetics in Metallurgical Phenomena v1 p345-415 1965.

Descriptors: (*Oxidation, Metals), Oxides, Oxygen, Nucleation, Chemical reactions, Epitaxial growth, Copper, Low-pressure research, Crystal lattice defects, Solubility.

A review of the various theories of oxidation of metals is given with an evaluation of these theories in the light of recent experimental results. The importance of such factors as crystal orientation, oxide nucleation, oxygen solution and epitaxy are discussed. Recent experimental results on low pressure oxidation of copper are presented.
AD-643 676 Not available from CFSTI.

THE OXIDATION OF COPPER SINGLE CRYSTALS. I. THE EARLY STAGES OF THE LOW PRESSURE OXIDATION PROCESS. II. EPITAXY.

Technical rept.,
Virginia Univ., Charlottesville. Dept. of Materials Science.
Kenneth R. Lawless, and Don F. Mitchell. Oct 66, 22p MS-3531-105-66U
Contract Nonr-474 (11)
Availability: Published in Memoires Scientifiques Rev Metallurg v62 p27-45 May 15 1965.

Descriptors: (*Copper, Oxidation), (*Single crystals, Copper), Low-pressure research, Epitaxial growth, Chemical reactions, Oxygen, Oxides, Nucleation, Chemical contamination, Surface properties.

The early stages of the low pressure oxidation process of copper single crystals have been studied by means of electron diffraction and microscopy. The importance of oxygen solution prior to the nucleation of oxide was demonstrated. The effects of trace contaminants was also shown. Epitaxial studies are also reported for copper oxide and copper bromide. (Author)
AD-643 677 Not available from CFSTI.

NEW MATERIALS IN ENGINEERING,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
E. B. Trostyanskaya, B. A. Kolachev, and S. I. Silvestrovich. 14 Sep 66, 943p FTD-HT-66-269 TT-67-60219
Unedited rough draft trans. of mono. Novye Materialy v Tekhnike, Moscow, 1962 656p.

Descriptors: (*Materials, Engineering), (*Industrial production, Materials), (*Chemical industry, Synthesis (Chemistry)), Plastics, Silicates, Powder metallurgy, Semiconductors, Protective treatments, Metals, Alloys, Titanium, Zirconium, Beryllium, Elastomers, Rubber, Adhesives, Sealing compounds.

This textbook has been prepared by a large staff of specialists to describe the new materials which are gaining acceptance in the various branches of engineering - plastics, rubbers, protective coatings, ceramic materials, glass and fiberglass, bonding materials, cermets, semiconductors, titanium, zirconium and similar new alloys. Specifications are presented for the new materials that have found application, as well as for materials of promise, for which we present their properties, and the methods and areas of their application.
AD-643 685 HC$3.00 MF$0.65

GROWTH AND STRUCTURE OF ELECTRODEPOSITED THIN METAL FILMS.
Technical rept.,
Virginia Univ., Charlottesville. Dept. of Materials Science.
Kenneth R. Lawless. 28 Aug 64, 14p MS-3531-106-66U
Contract Nonr-474 (11)
Availability: Published in The Journal of Vacuum Science and Technology v2 n1 p24-34 Jan/Feb 1965.

Descriptors: (*Films, Substrates), (*Electrodeposition, Films), Single crystals, Twinning (Crystallography), Copper, Nickel, Gold, Electron diffraction analysis, Nucleation, Structural properties.

The growth and structure of thin electrodeposits of several metals on single-crystal substrates have been studied by means of electron diffraction and electron microscopy. Deposits of copper on nickel, nickel on copper, and gold on copper show a highly perfect orientation at all thicknesses up to 1000 A. All deposits studied were continuous for thicknesses greater than 50 A. Gold deposits of 15 A were discontinuous on the (111) face. Few growth twins were found but double positioning structures occurred in both nickel and gold films. Evidence for the enhanced nucleation of copper deposits on substrate twins was found.
AD-643 688 Not available from CFSTI.

MATERIALS SCIENCES RESEARCH.
Purdue Univ., Lafayette, Ind.
For primary bibliographic entry see Field 20L.
AD-643 715 HC$3.00 MF$0.65

METHODS OF IMPROVING THE HEAT-RESISTANT PROPERTIES OF MATERIALS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. A. Oding, and P. V. Zubarev. 24 Aug 66, 10p FTD-TT-66-111 TT-67-60256
Unedited rough draft trans. of mono. Polzuchest i Ditelnaya Prochnost, Novosibirsk, 1963 p70-4.

Descriptors: (*Heat-resistant metals + alloys, Deformation), (*Crystal structure, Heat-resistant metals + alloys), Creep, Crystal lattice defects, Density, Iron, Steel, Recrystallization, Relaxation time, Annealing, Plasticity, Heat treatment.

The improvement in the heat resistance of steels and alloys, i. e., the increasing of the period of service at elevated temperatures and lowering the rate of creep in the second area proves to be one of the timely problems in modern metallurgy. The combining of plastic deformation with heat treatment, and also the radiating of metals with nuclear particles create premises for considerable improvement in heat-resistant properties.
AD-643 726 HC$3.00 MF$0.65

A TRANSMISSION ELECTRON MICROSCOPY AND DIFFRACTION STUDY OF THE OXIDATION OF SINGLE CRYSTAL NICKEL FILMS.
Technical rept.,
Virginia Univ., Charlottesville. Dept. of Materials Science.
Lucille B. Garmon, and Kenneth R. Lawless. Oct 66, 5p MS-3531-108-66U
Contract Nonr-474 (11)
Availability: Published in International Congress for Electron Microscopy, Kyoto (6th) p541-2 1966.

Descriptors: (*Nickel, Oxidation), (*Oxidation, Metal films), Electron microscopy, Single crystals, Epitaxial growth, Crystal lattice defects, Substrates, Oxides, Oxygen, Solubility.

Single crystal nickel films 800 A thick were oxidized at 10-4 Torr and at temperatures of 500 - 700C. An induction period is observed during which superlattice reflections appear. After the induction period oxide nuclei form with specific orientation relationships. No general correlation between oxide nuclei and dislocations in the metal was observed.
AD-643 747 Not available from CFSTI.

OPTICAL PROPERTIES OF METALS AND SEMICONDUCTING MATERIALS.
Research rept.,
Navy Electronics Lab., San Diego, Calif.
T. G. Pavlopoulos. 22 Aug 66, 33p NEL-1397

Descriptors: (*Metal films, Optical properties), (*Semiconductors, Optical properties), Vacuum apparatus, Electrical properties, Quantum mechanics, Thermodynamics, Electromagnetic properties, Crystal lattice defects, Surface properties, Electrical conductance.

Theory of electrical and optical properties of conducting media is reviewed. Properties of thin films (thickness less than 200 angstroms) are shown to be affected by reduction of the mean free path of an electron by the boundaries of the film. Changes in properties by lattice imperfections or impurities are traced to incorrect preparation of films. A program is outlined to enlarge understanding of metals and semiconductors by investigation of films prepared by ultrahigh-vacuum techniques. Boundary effects, surface phenomena, and consideration of lattice defects and impurities are included. (Author)
AD-643 755 HC$3.00 MF$0.65

THE RECRYSTALLIZATION KINETICS AND ELECTRON MICROSCOPY OF MAGNESIUM AND CHROMIUM.
Utah Univ., Salt Lake City. Dept. of Metallurgy.
For primary bibliographic entry see Field 20B.
AD-643 764 HC$3.00 MF$0.65

DETERMINATION OF THE DIFFUSION COEFFICIENTS IN ALLOYS WITH SEVERAL PHASES,
Redstone Scientific Information Center, Redstone Arsenal, Ala.
For primary bibliographic entry see Field 7D.
AD-643 803 HC$3.00 MF$0.65

RADIATION BACKSCATTERING AND RADIATION-INDUCED X-RAYS FOR MEASURING SURFACE COMPOSITION AND STRUCTURE,
Frankford Arsenal, Philadelphia, Pa. Pittman-Dunn Research Labs.
For primary bibliographic entry see Field 18B.
AD-643 858 Not available from CFSTI.

WEAR RESISTANCE OF ALLOYS FOR GAS TURBINE INSTALLATIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. I. Lavysh, and M. G. Morozov. 7 Oct 66, 10p FTD-HT-66-511 TT-67-60233
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Energetika (USSR), v8 n9 p115-9 1965.

Descriptors: (*Wear resistance, Refractory metal alloys), (*Heat-resistant metals + alloys, Wear resistance), Structural properties, Gas turbines, Turbine parts, Dust, Friction, Grain boundaries, Steel, Temperature, Nickel alloys.

The problem of structural materials for gas turbine installations has been satisfactorily solved by the level of their heat resistance and it was perfectly and entirely uncovered with respect to wear resistance.
AD-643 876 HC$3.00 MF$0.65

INFLUENCE OF HYDROGEN ON THE MECHANICAL PROPERTIES OF CHARPY V - NOTCH SPECIMENS OF LOW CARBON STEEL.
Technical rept.,
Stanford Univ., Calif. Dept. of Materials Science.
Arnaud P. Fayet. Sep 66, 54p TR-4, SU-DMS-66-8
AROD-4800:4
Contract DA-31-124-ARO (D)-251
Master's thesis.

Descriptors: (*Steel, *Hydrogen embrittlement), Fracture (Mechanics), Carbon alloys, Ductile brittle transition.

Hydrogen embrittlement has been studied in steels containing 0.16% and 0.006% carbon which were subjected to an electrolytical charging. Charpy V - notch specimens of these materials were tested in three point slow bend loading. No embrittling effect of hydrogen appears below the ductility transition temperature of either alloy. Above this temperature, hydrogen embrittlement results from the formation of a high density of voids and the sharpening of the notch tip by coalescence with these voids. In contrast to the case of Iron -3% silicon, there is no evidence of hydrogen induced cleavage cracks. (Author)
AD-643 944 HC$3.00 MF$0.65

EFFECT OF TITANIUM, ALUMINUM, CARBON, AND BORON ON THE STRUCTURE AND PHASE COMPOSITION OF A NICKEL BASE ALLOY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. S. Chernyak, A. V. Smirnova, and G. A. Kokoon. 23 Sep 66, 19p FTD-TT-65-1412
TT-67-60271
Edited trans. of Tsentralnyi Nauchno-Issledovatelskii Institut Chernoi Metallurgii. Shornik Trudov (USSR) n38 p51-65 1964.

Descriptors: (*Nickel alloys, Metallography), (*Crystal structure, Nickel alloys), Phase studies, Microstructure, Titanium alloys, Aluminum alloys, Carbon alloys, Boron alloys, Metallurgical laboratories, Crystal lattices.

The use of complex methods of investigation, i.e., metallographic method involving stained film etching, electron microscopic, x-ray structural, electron-diffraction methods, etc., made it possible to establish the nature of the principal phases present in the batches studied, and also the influence of alloying elements, i.e., carbon, boron, titanium, and aluminum, on the structure and phase composition of the alloy.
AD-643 968 HC$3.00 MF$0.65

MAGNETIC ALLOYS FOR HIGH TEMPERATURE SERVICE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. V. Pshechenkova, and A. D. Skokov. 2 Sep 66, 11p FTD-HT-66-196
TT-67-60282
Unedited rough draft trans. of Elektrichestvo (USSR), n4 p81-3 1965.

Descriptors: (*Heat-resistant metals + alloys, Magnetic properties), USSR, Iron, Iron alloys, Cobalt alloys, Vanadium alloys, Mechanical properties, High-temperature research.

Curves were obtained of the magnetization of iron, iron-cobalt alloys, and alloy of the type Permendur at temperatures up to 900C and also measurements were made of the mechanical properties of alloys at temperatures up to 800C. The alloys of iron with cobalt have a high index of induction at high temperatures. The data obtained can be used for computing magnetic systems which operate at high temperatures. (Author)
AD-643 991 HC$3.00 MF$0.65

CERTAIN FOUR COMPONENTS OF A SEMICONDUCTIVE PHASE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20L.
AD-644 011 HC$3.00 MF$0.65

PHASE COMPOSITION, STRUCTURE, AND PROPERTIES OF ALLOY STEELS AND ALLOYS. (SELECTED ARTICLES).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
30 Aug 66, 59p FTD-MT-66-16
TT-67-60299
Edited machine trans. of mono. Fazovyi Sostav, Struktura, i Svoistva Legirovannykh Stalei i Splavov, Moscow, 1965 p5-19, 28-38, 39-47, 202-10.

Descriptors: (*Heat-resistant metals + alloys, Steel), (*Steel, Refractory metal alloys), Phase studies, Carbon, Nickel alloys, Mechanical properties, Refining (Metallurgy), Surfaces, Heat treatment, Alloys, Oxidation, Annealing, Corrosion.

CONTENTS: Certain Questions of Analysis of Isolated Phases and Phase Composition of Alloys; Phase-Shift Analysis of Alloys of Type E1437B with Variable Carbon Content; Surface Oxidation and Phase Change in Heat-Resisting Nickel Alloys in Loaded State; Phase Composition of Surface Layers of Heat-Resisting Alloys After Heating in Different Media.
AD-644 036 HC$3.00 MF$0.65

THE USE OF ELECTRONIC COMPUTERS TO CALCULATE RADIATION DISTURBANCES IN METALS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 18H.
AD-644 051 HC$3.00 MF$0.65

EFFECTS OF ORIENTATION AND CARBON ON THE MECHANICAL PROPERTIES OF IRON SINGLE CRYSTALS,
General Electric Research Lab., Schenectady, N. Y.
D. F. Stein, and J. R. Low, Jr. 6 Dec 66, 16p
AROD-4074:5
Contract DA-31-124-ARO (D)-95
Availability: Published in Acta Metallurgica v14 p1183-94 Oct 1966.

Descriptors: (*Single crystals, Iron), (*Iron, Mechanical properties), Carbon, Impurities, Annealing, Degasification, Hardening, Radioactive isotopes, Crystal lattice defects, Twinning (Crystallography).

High-purity iron single crystals of various orientations containing less than 0.005 ppm of carbon, 2 ppm of nitrogen, and 20 ppm of oxygen were prepared by annealing in a high-purity hydrogen gas stream continuously gettered by zirconium. To these crystals, 0.9 ppm and 44 ppm of radioactive carbon 14 were added to study the effect of carbon on the yield stress and the temperature dependence of the yield stress from 300 to 20K. It was found that the yield stress and the temperature dependence of the yield stress increased with increasing carbon content in accordance with the theory of Fleischer for hardening by interstitial impurities in iron. It was also found that at low test temperatures, the critical resolved shear stress law is not obeyed by high-purity iron. The critical resolved shear stress is a minimum in the easy slip orientation and reaches a maximum in the (110) tensile axis orientation.
AD-644 080 Not available from CFSTI.

STUDYING THE OXIDATION OF Ni3A1 - Ni3Nb ALLOY SYSTEMS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
M. P. Arbuzov, and V. G. Chuprina. 29 Aug 66, 13p FTD-HT-66-129
TT-67-60321
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR) n1 p93-8 1964.

Descriptors: (*Nickel alloys, Oxidation), (*Heat-resistant metals + alloys, Oxidation), Aluminum alloys, Niobium alloys, Intermetallic compounds, Phase studies, Crystal structure, Heat of activation, Dilatometers.

The heat resistance of alloys, working at high temperatures, depends in a considerable degree upon the alloying components, introduced into these alloys. A majority of heat resistant alloys of industrial value have a nickel base, whereby, many of them are alloyed with aluminum and niobium. This time greater attention has been attracted by the problem of creating heat resistant alloys on the basis of intermetallic compounds.
AD-644 166 HC$3.00 MF$0.65

COMPARISON OF THE RADIATION STABILITY OF UO2-ZRO2 WITH THAT OF UO2 AND UO2-BEO,
Battelle Memorial Inst., Columbus, Ohio.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 20 24.
BMI-1782 HC$3.00 MF$0.65

MATERIAL PROPERTIES HANDBOOK. VOLUME IV - HEAT RESISTING ALLOYS.
Royal Aeronautical Society, London (England). Engineering Sciences Data Unit.
N. H. Mason. May 66, 260p

Descriptors: *Aircraft design, *Alloy, *Heat resistance, *Power plant, *Structural material, Aircraft, Chemical, Cobalt, Design, Elevation, Heat, Iron, Material, Mechanical, Metal, Missile, Nickel, North atlantic treaty organization (nato), Physical, Plant, Power, Property, Resistance, Spacecraft, Structural, Temperature.

For abstract, see STAR 05 02.
N67-11244 HC$3.00 MF$0.65

SPACE-POWER-SYSTEM MATERIAL COMPATIBILITY TESTS OF SELECTED REFRACTORY METAL ALLOYS WITH BOILING POTASSIUM.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
T. A. Moss, L. Rosenblum, and C. M. Scheuermann. 1966, 18p NASA-TM-X-52242
Presented At The Symp. On Alkali Metal Coolants - Corrosion Studies And System Operating Experience, Vienna, 28 Nov. - 2 Dec. 1966, Sponsored By Intern. Atomic Energy Agency

Descriptors: *Material testing, *Power supply, *Refractory alloy, Alloy, Boiling, Compatibility, Corrosion, Material, Niobium, Oxygen, Potassium, Power, Refractory, Space, Stress, Supply, Tantalum, Testing, Tubing, Turboelectric.

For abstract, see STAR 05 02.
N67-11330 HC$3.00 MF$0.65

STRUCTURAL AND MECHANICAL EFFECTS OF INTERSTITIAL SINKS.
Solar, San Diego, Calif.
W. D. Brentnall, M. J. Klein, and A. G. Metcalfe. Oct 66, 24p NASA-CR-79546, RDR-1534-1
Contract NAS7-469

Descriptors: *Dispersion hardening, *Mechanical property, *Metal coating, *Niobium alloy, *Surface reaction, Alloy, Analysis, Change, Chemical, Coating, Creep, Dispersion, Hardening, High temperature, Interstitial, Mechanical, Metal, Niobium, Property, Reaction, Sink, Structure, Vacuum.

For abstract, see STAR 05 02.
N67-11737 HC$3.00 MF$0.65

TITANIUM AND ITS ALLOYS. PUBLICATION NO. 10 - INVESTIGATION OF TITANIUM ALLOYS.
Israel Program For Scientific Translations, Ltd., Jerusalem.
I. I. Kornilov. 1966, 444p NASA-TT-F-362, TT-65-50139
Transl. Into English Of The Publ. "titan I Ego Splavy. Issledovaniya Titanovykh Splavov" Moscow, Izd. An Sssr, 1963 Papers Presented At The 2d Conf. On The Theoret. And Exptl. Invest. Of Titanium Alloys, Moscow, Mar. 1962 Published For Nasa And Nsf

Descriptors: *Chemical reaction, *Conference, *Corrosion resistance, *Mechanical property, *Titanium, Alloy, Chemical, Composition, Corrosion, Crack, Creep, Diagram, Dilatometer, Elasticity, Electrochemistry, Embrittlement, Equilibrium, Formation, Gas, Heat, Hydrogen, Kinetics, Mechanical, Metal, Microstructure, Oxidation, Phase, Property, Reaction, Resistance, Strength, Structure, Thermostability, Transformation, Treatment, Welding.

For abstract, see STAR 05 02.
N67-11761 HC$3.00 MF$0.65

METAL CARBIDE-GRAPHITE COMPOSITES QUARTERLY REPORT, AUG. 1 - OCT. 31, 1966.
Ist Research Inst., Chicago, Ill.
Y. Harada. 27 Oct 66, 24p NASA-CR-79757, QR-1
Contract NASR-65(09)

Descriptors: *Composite material, *Mechanical property, *Niobium carbide, *Physical property, *Tantalum carbide, Carbide, Composite, Compression, Conductivity, Deformation, Electric, Expansion, Flexure, Graphite, High temperature, Material, Mechanical, Metal, Niobium, Physical, Property, Strength, Tantalum, Thermal.

For abstract, see STAR 05 02.
N67-12072 HC$3.00 MF$0.65

INVESTIGATION OF FIBER SYSTEMS OF ABLATIVE MATERIALS FINAL REPORT.
Texaco Experiment, Inc., Richmond, Va.
G. H. Miller, and G. C. Robinson, Jr.. 30 Sep 65, 173p NASA-CR-54722, TEI-TP-259
Contract NAS3-4196

Descriptors: *Ablating material, *Composite material, *Reinforcing fiber, *Rocket chamber, Ablation, Arc, Argon, Boride, Boron, Carbide, Chamber, Chemical, Combustion, Composite, Fiber, Fuel, Graphite, Liquid, Material, Oxide, Oxidizer, Physical, Plasma, Plating, Product, Property, Reinforcement, Resistance, Rocket engine, Test, Thrust, Titanium, Tungsten, Vapor, Zinc.

For abstract, see STAR 05 02.
N67-12273 HC$3.00 MF$0.65

EXPANSION OF A CUTTING TOOL DURING CHIP REMOVAL,
California Univ., Livermore. Lawrence Radiation Lab.
James B. Bryan, Richard W. Clouser, and Eldon R. McClure. 21 Jul 66, 7p
Contract W-7405-eng-48

Descriptors: (*Cutting tools, Thermal expansion), (*Machining, Coolants).

For abstract, see NSA 20 24.
UCRL-50116 HC$3.00 MF$0.65

MACHINING AND FINISHING FINEGRAIN BERYLLIUM,
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
V. M. Hovis. 12 Oct 66, 34p
Contract W-7405-eng-26

Descriptors: (*Grain structures (Metallurgy), Beryllium), (*Beryllium, Machining).

For abstract, see NSA 20 24.
Y-1551 HC$3.00 MF$0.65

11G. MISCELLANEOUS MATERIALS

MICROWAVE PROPERTIES OF MANGANESE SUBSTITUTED Zn2Y SINGLE CRYSTALS AS A FUNCTION OF TEMPERATURE.
Technical rept.,
Army Electronics Command, Fort Monmouth, N.J.
Gilbert McCall, and Lothar Maertin. Sep 66, 26p
ECOM-2762

Descriptors: (*Ferromagnetic materials, Microwave equipment), Anisotropy, Magnetic resonance, Single crystals, Manganese compounds, Zinc compounds, Yttrium compounds, Iron compounds, Oxides, Ferrites, Temperature.

The microwave resonance properties of Ba2Zn2-xMnx+yO22 have been studied over the temperature range of -196C to +120C. This particular series was selected for study because previous work showed that it possesses the narrowest linewidths of any known planar ferrites, thereby giving it the greatest probability of being used in device applications such as limiters, filters and harmonic generators. Data is given for anisotropy field and ferrimagnetic resonance linewidths as a function of temperature. (Author)
AD-643 753 HC$3.00 MF$0.65

SURFACE VISCOSITY OF POLYDIMETHYLSILOXANE MONOLAYERS.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 7D.
AD-643 847 HC$3.00 MF$0.65

THE PRODUCTION OF SOFT-MAGNETIC MATERIALS BY THE METHOD OF POWDER METALLURGY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. I. Litovchenko, and G. G. Dobrovolskii. 29 Jul 66, 9p FTD-HT-66-320
TT-67-60293
Unedited rough draft trans. of Mashinostroenie (USSR), n4 p68-9 1964.

Descriptors: (*Magnetic materials, Production), (*Powder metallurgy, Magnetic materials), Steel, Magnetic fields, Mproperties, Wastes (Industrial), Magnetic properties, Metal-forming presses, Electrical equipment, Grain size, Density, Porosity.

Electrical technology uses a large number of parts made from low-carbon chemically pure armko steel. Such parts are generally called magnetically soft. They operate in a constant, pulsed or variable magnetic field, because of which they require a low coercive force (0.9 - 1.5 Oe), a magnetic induction within the range of 14000 - 15000 Gs and a magnetic permeability of 3.5 - 5.5 thousand Gs/O3. Conversion to the production of soft magnetic material by the method of powder metallurgy permits the saving of a large quantity of electrotechnical steel, the reduction of labor in fabrication, mechanization and automation of production processes while maintaining the required magnetic properties.
AD-644 048 HC$3.00 MF$0.65

IONIC THERMOCURRENTS IN DIELECTRICS,
Milan Univ. (Italy). Instituto Di Fisica.
For primary bibliographic entry see Field 20C.
AD-644 079 Not available from CFSTI.

SWELLING TESTS WITH CABLE INSULATING MATERIALS IN FOUR TYPES OF OIL.
Zwelproeven Mit Mantels Van Een Aantal Kabels In 4 Oliesoorten
Rubber Research Inst. Tno, Delft (Netherlands).
G. J. Flim, J. J. Kruys, and E. A. Walraad. 14 Jun 66, 5p TDCK-45714, MAR-6606
In Dutch

Descriptors: *Electric insulation, *Fuel oil, *Hydraulic fluid, *Lubricating oil, *Material testing, Cable, Compound, Diesel, Electric, Fuel, Hydraulic, Hypalon, Insulation, Lubricant, Material, Neoprene, Netherlands, Oil, Rubber, Swelling, Testing, Vinyl.

For abstract, see STAR 05 02.
N67-11999 HC$3.00 MF$0.65

11H. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AN EXPERIMENTAL STUDY OF GRID TURBULENCE IN DILUTE HIGH-POLYMER SOLUTIONS.
Naval Ordnance Test Station, China Lake, Calif.
For primary bibliographic entry see Field 20D.
AD-644 148 HC$3.00 MF$0.65

11I. PLASTICS

HUGONIOT DATA FROM SHOCK-INDUCED POLARIZATION EXPERIMENTS WITH GAMMA-IRRADIATED POLYETHYLENE.
Technical note,
Ballistic Research Labs., Aberdeen Proving Ground, Md.
George E. Hauver. Oct 66, 17p BRL-TN-1628

Descriptors: (*Polyethylene plastics, *Radiation damage), (*Polarization, Polyethylene plastics), Shock waves, Experimental data, Surface properties, Velocity.

Low-density polyethylene specimens were exposed to air to gamma radiation in order to produce polar oxide surface regions which generated polarization signals where subjected to intense shock compression. Shock velocities were obtained by polarization measurements, and Hugoniot points between 75 and 192 kilobars were established by graphical procedure. Measurements at 94 kilobars indicated were established by graphical procedure. Measurements at 94 kilobars indicated that radiation doses below 2.0 x 10 to the 8th power rads had negligible effect on the Hugoniot. (Author)
AD-643 522 HC$3.00 MF$0.65

AN IMPROVED METHOD FOR PREDICTING MECHANICAL PROPERTIES OF FIBRE COMPOSITE MATERIALS.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 11D.
AD-643 546 HC$3.00 MF$0.65

NEW MATERIALS IN ENGINEERING,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11F.
AD-643 685 HC$3.00 MF$0.65

EFFECT OF THE DEGREE OF ELONGATION OF POLYMETHYLMETHACRYLATE (PMMA) ON THE MAGNITUDE OF THE SECOND MOMENTS OF A NUCLEAR MAGNETIC RESONANCE SPECTRUM (YAMR),
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7D.
AD-643 729 HC$3.00 MF$0.65

MICROMECHANICAL BEHAVIOR OF FIBER REINFORCED PLASTICS.
Final rept., 14 Jun 65-14 May 66,
Whittaker Corp., San Diego, Calif. Narmco Research and Development Div.
Juan Haener. Sep 66, 128p
USAAVLABS-TR-66-62
Contract DA-44-177-AMC-320 (T)

Descriptors: (*Plastics, Stresses), (*Photoelasticity, Plastics), Composite materials, Fibers (Synthetic), Mechanical properties, Reinforcing materials, Loading (Mechanics), Polymerization, Temperature, Shrinkage.

The distribution of stresses in a unidirectionally oriented, multifiber composite as a result of process shrinkage and external loads has been ana-

lyzed after assuming continuity boundary conditions at the interface and certain hexagonal boundary conditions in the space between the reinforcements. Selected model specimens have been numerically analyzed by computer, and the results have been compared with photoelastic experimental studies.
AD-643 813 HC$3.00 MF$0.65

ENERGY SPECTRUM Pi-ELECTRONS IN LONG CHAINS OF CONJUGATE BONDS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7D.
AD-643 961 HC$3.00 MF$0.65

RESEARCH STUDY ON COLD DRAWING PHENOMENA IN HIGH POLYMERS.
Technical rept.,
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
R. D. Andrews, Jr., S. W. Allison, D. H. Ender, R. M. Kimmel, and W. Whitney. Aug 66, 174p
C/OM-25, USA-NLABS-TR-67-10-CM
Contract DA-19-129-AMC-238 (N)

Descriptors: (*Plastics, Deformation), Polymers, Fracture (Mechanics), Cold working, Stresses, Birefringence, Styrene plastics, Thermoplastics, Drawing (Machine processing).

A fundamental study of the phenomenon of cold-drawing (plastic yield) in polymers has been carried out, through which a better understanding of several of the features of this process has been achieved. The effects of temperature, thermal history, stress-field, chemical structure and pre-orientation on the stress-strain behavior of both glassy and crystalline polymers have been explored. The behavior of several polymers, particularly polystyrene and polymethyl methacrylate, in stress relaxation, relation-recovery cycling and creep, especially with respect to delayed drawing, was investigated in detail. The geometry of neck formation has been quantitatively investigated by photographic techniques, and volume changes during compression have been measured using a mercury dilatometer. Microscopic modes of yielding, particularly the formation of deformation bands, are described. Birefringence changes during deformation of polyacrylonitrile under various conditions and during hot and cold extension of polystyrene and polymethyl methacrylate are presented and related to the molecular processes believed to be occurring. The development of a molecular theory of drawing is attempted through three different paths of approach: (1) a defect model analogous to dislocations, (2) a mathematical model of the 'fiber bundle' type, and (3) a description in terms of the breakdown of secondary intermolecular cohesive bonding. General conclusions and recommendations for future studies in these areas are presented. (Author)
AD-644 021 HC$3.00 MF$0.65

QUARTERLY PROGRESS REPORT FOR OCTOBER-NOVEMBER-DECEMBER, 1964.
Walter Reed Army Medical Center, Washington, D. C. Army Medical Biomechanical Research Lab.
For primary bibliographic entry see Field 6E.
AD-644 025 HC$3.00 MF$0.65

LIGHT SENSITIVITY OF POLYVINYLCINNAMATE AND ITS NITRODERIVATIVES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7E.
AD-644 044 HC$3.00 MF$0.65

A THEORY OF THE MECHANICAL PROPERTIES OF SPHERULITES.
Massachusetts Univ., Amherst. Polymer Research Inst.
For primary bibliographic entry see Field 20B.
AD-644 098 HC$3.00 MF$0.65

WEAR AND FRICTION OF VARIOUS POLYMER LAMINATES IN LIQUID NITROGEN AND IN LIQUID HYDROGEN.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
R. L. Johnson, L. P. Ludwig, and D. W. Wisander. Nov 66, 15p NASA-TN-D-3706
Contract 129-03-13-01-22

Descriptors: *Friction measurement, *Laminate, *Liquid gas, *Polymer, *Wear, Cotton, Epoxy, Formaldehyde, Friction, Gas, Glass, Graphite, Hydrogen, Liquid, Measurement, Melamine, Nitrogen, Nylon, Phenol, Polytetrafluoroethylene, Sliding.

For abstract, see STAR 05 02.
N67-11346 HC$3.00 MF$0.65

DEVELOPMENT OF CHARACTERIZED AND REPRODUCIBLE SYNTACTIC FOAM OF PHENOLIC NYLON FOR HEAT SHIELDS FINAL REPORT, 1 FEB. - 31 DEC. 1965.
Hughes Aircraft Co., Culver City, Calif. Aerospace Group.
L. B. Keller. 31 Dec 65, 209p NASA-CR-73041, P66-49
Contract NAS2-2739

Descriptors: *Ablating material, *Heat shield, *Nylon, *Phenol resin, Ablation, Characterization, Cone, Foam, Heat, Low density, Material, Nose, Phenol, Reproduction, Resin, Scout project, Shield, Syntactic.

For abstract, see STAR 05 02.
N67-11986 HC$3.00 MF$0.65

11J. RUBBERS

A METHOD OF PRODUCING A HEAT-RESISTANT HERMETIC SEALER BASED ON FLUORINE-RUBBER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11A.
AD-644 038 HC$3.00 MF$0.65

ON THE THERMOELASTIC INVERSION POINT OF SWOLLEN RUBBER.
Interim rept.,
Weizman Inst. of Science, Rehovoth (Israel). Polymer Dept.
A. Oplatka, and A. Katchalsky. 19 Jun 65, 12p
AFOSR-66-2594
Grant AF-EOAR-62-58
Availability: Published in Makromolekulare Chemie v92 p251-9 1966.

Descriptors: (*Rubber, Molecular association), Elasticity, Thermal expansion, Thermal stresses, Thermal properties, Alkanes, Israel.

A thermoelastic inversion point has long been known for dry rubber. Inversion points are reported for natural rubber swollen to different extents by n-hexadecane. A theoretical analysis of the length at the inversion point as a function of the degree of swelling is presented and shown to be in good agreement with the experimental findings. (Author)
AD-644 070 Not available from CFSTI.

THERMODYNAMICS, THERMAL EFFECTS AND DILATATION OF NATURAL RUBBER,
Polytechnic Inst. of Brooklyn, N. Y.
Michel Boel, and Frederick Eirich. Oct 66, 210p
PIBAL-931
Contract Nonr-839 (32)

Descriptors: (*Rubber, Deformation), (*Elastomers, Thermal properties), Vulcanizates, Stability, Thermodynamics, Elasticity, Equations of state, Entropy, Molecular weight, Strain (Mechanics), Stresses.

Of the three different experiments carried out on natural rubber, the force versus temperature measurement have verified that the decay of stress in stretched elastomers is approximately linear with logarithm of time for a considerable period. A viscoelastic mechanism for this decay according to a spectrum of Maxwell terms, can be ruled out as the basis for this form of relaxation because of the nature of the time dependence. As a further difficulty small local defects leading to crack propagation by stress concentration and crystallization of the sample complicate this relatively simple but unexplained form of relaxation. Thus, there is a natural difficulty in the way of determining when the criterion of equilibrium has been adequately fulfilled. In our experiments, the sample was considered fully relaxed when the increment of relaxation over the total span of testing was less than one percent. A new dilatometer was constructed which allows to follow volume changes with stretching. For the first time complications due to swelling could be overcome. Extremely small volume increases were determined during the early exploratory runs, but the dilatometer has to be reconstructed to eliminate metal corrosion.
AD-644 112 HC$3.00 MF$0.65

POLYURETHANE ELASTOMERIC COMPOUND CPS 796-80, TYPE III QUALIFICATION TEST REPORT.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. H. Flack. 8 Jul 66, 25p NASA-TM-X-57998, ESE-Q-74

Descriptors: *Elastomer, *Polyurethane, *Saturn launch vehicle, *Thermal insulation, Arc, Compound, Compression, Dielectric, Environment, Flexibility, Insulation, Launch, Low temperature, Moisture, Qualification, Resistance, Saturn, Strength, Surface, Tear, Testing, Thermal, Vehicle, Viscosity, Volume.

For abstract, see STAR 05 02.
N67-12229 HC$3.00 MF$0.65

EVALUATION POLYURETHANE ELASTOMERIC COMPOUND CS-3547, TYPE III.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. H. Flack. 28 Jul 66, 25p NASA-TM-X-59137, ESE-E-59

Descriptors: *Elastomer, *Electric equipment, *Polyurethane, Circuit, Component, Connector, Control, Electric, Equipment, Evaluation, Flexibility, Heat, High temperature, Quality, Resistance, Specification, Strength, Tensile.

For abstract, see STAR 05 02.
N67-12265 HC$3.00 MF$0.65

EVALUATION POLYURETHANE ELASTOMERIC COMPOUND CPS-796-65, TYPE II.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. H. Flack. 28 Jul 66, 26p NASA-TM-X-59136, ESE-E-73

Descriptors: *Encapsulation, *Material testing, *Polyurethane, Compound, Compression, Dielectrics, Elastomer, Evaluation, Material, Moisture, Performance, Resistance, Surface, Temperature, Testing, Viscosity, Volume.

For abstract, see STAR 05 02.
N67-12266 HC$3.00 MF$0.65

EVALUATION POLYURETHANE ELASTOMERIC COMPOUND URALANE 5712, TYPE III.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. H. Flack. 28 Jul 66, 26p NASA-TM-X-59135, ESE-E-19

Descriptors: *Encapsulation, *Material testing, *Polyurethane, Adhesion, Compound, Compression, Dielectrics, Elastomer, Evaluation, Hardness, Material, Moisture, Performance, Resistance, Temperature, Tensile, Testing.

For abstract, see STAR 05 02.
N67-12267 HC$3.00 MF$0.65

RESEARCH SUMMARY ON FRACTURE OF SWOLLEN RUBBER.
California Inst. Of Tech., Pasadena. Graduate Aeronautical Labs.
H. K. Mueller. Nov 66, 7p NASA-CR-80195, GALCIT-SM-66-15
Grant NSG-172-60

Descriptors: *Crack propagation, *Rubber, *Strain, Crack, Diagram, Failure, Propagation, Rate, Solubility, Stress, Swelling.

For abstract, see STAR 05 02.
N67-12276 HC$3.00 MF$0.65

11K. SOLVENTS, CLEANERS, AND ABRASIVES

THE SOLUTION PROPERTIES OF SOME POLYOXYETHYLENE-POLYOXYPROPYLENE SURFACTANTS IN NONAQUEOUS SOLVENTS,
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
J. M. G. Cowie, and A. F. Sirianni. 4 May 66, 5p NRC-9208
Prepared for presentation in part at the AOCS Meeting, Cincinnati, October 1965.
Availability: Published in The Journal of the American Oil Chemists' Society v43 n10 p572-5 1966.

Descriptors: (*Surface-active substances, Solutions), Ethylene oxide, O-heterocyclic compounds, Polymers, Organic solvents, Optical properties, Vapor pressure, Ultracentrifuges, Concentration (Chemistry), Molecular weight, Canada.
Identifiers: Pluronics, Polyoxyethylenes, Polyoxypropylenes.

Results obtained with Pluronic polyol homologues in benzene and in dioxane by light-scattering, ultracentrifugal and vapor pressure lowering measurements in addition to data obtained in water and in butyl chloride by light-scattering and ultracentrifugal determinations are described. The systems are examined over a wide range of solute concentrations at about 37C. Considerable difference appears to exist between weight and number-average micellar weight obtained by light-scattering and two methods of measuring vapor pressure lowering of the solutions. Divergence in micellar weight values appears to be less pronounced between the latter technique and ultracentrifugal determinations. Possible micellar configurations of these Pluronic polyols are presented. (Author)
AD-643 856 Not available from CFSTI.

11L. WOOD AND PAPER PRODUCTS

COMMON PLANTS OF LONGLEAF PINE-BLUESTEM RANGE.
Research paper,
Southern Forest Experiment Station, New Orleans, La.
Harold E. Grelen, and Vinson L. Duvall. 1966, 100p RP-SO-23

Descriptors: (*Plants (Botany), Identification), (*Bovines, Food), Grasses, Trees, Forestry, Agriculture, Ecology, Beef, Production, Nutrition.

The publication describes many grasses, grasslike plants, forbs, and shrubs that inhabit longleaf pine-bluestem range. The species vary widely in importance; most produce forage palatable to cattle, some are noxious weeds, and others are valuable indicators of trends in range condition. All are abundant enough on certain sites, however, to require identification for accurate evaluation of grazing resources. Each species is described, its value as food for cattle and wildlife assessed, and its geographic range indicated. Line drawings show salient taxonomic features of species mentioned briefly as well as of those described fully. To aid identification of plants without floral parts, descriptions stress vegetative characters that are peculiar to each species, but detailed botanical descriptions have also been provided.
PB-173 634 HC$3.00 MF$0.65

SOUTHERN PULPWOOD PRODUCTION, 1965,
Southern Forest Experiment Station, New Orleans, La.
Richard L. Welch. 1966, 28p
Prepared in cooperation with Southeastern Forest Experiment Station, Asheville, N. C., and Southern Pulpwood Conservation Association, Atlanta, Ga.

Descriptors: (*Wood pulp, Production), Industrial plants, Manufacturing methods, Wood, Economics.

Pulpwood production in the South established another record high of 30,790,800 cords in 1965--63 percent of the Nation's total. At the year's end, there were 82 pulpmills in operation in the South, and their combined pulping capacities exceeded 59,000 tons per day. Eight new mills now under construction will boost the total daily capacity by 4,000 tons. Nine mills located outside the Region drew wood from the South in 1965.
PB-173 659 HC$3.00 MF$0.65

12. MATHEMATICAL SCIENCES

12A. MATHEMATICS AND STATISTICS

NORM DECREASING HOMOMORPHISMS OF GROUP ALGEBRAS.
Revised ed.,
Yale Univ., New Haven, Conn.
Frederick P. Greenleaf. 24 Apr 64, 37p
AFOSR-66-2026
Grant AF-AFOSR-407-63
Revision of manuscript submitted Aug 1 1964.
Prepared in cooperation with California Univ., Berkeley.
Availability: Published in Pacific Journal of Mathematics v15 n4 p1187-1219 1965.

Descriptors: (*Algebras, *Mapping (Transformations)), Groups (Mathematics), Measure theory, Algebraic topology.

The homomorphism phi of the group algebra L1 (F) into the algebra M (G) of measures, where F and G are locally compact groups, has been completely determined when both groups are abelian by P. J. Cohen, and when G is compact and the homomorphism is norm decreasing and order-preserving by Glicksberg. In this paper the structure of norm decreasing homomorphisms phi is determined for arbitrary locally compact F and G. As an application the special structure of all norm decreasing homomorphisms mapping L1 (F) onto L1 (G). The analysis is effected by finding all multiplicative sub-groups of the unit ball of measures on a locally compact group for, as we show, each extends to a norm decreasing homomorphism phi: M (F) approaches M (G), and is determined by the image under phi of the group of point masses on G, a multiplicative subgroup of the unit ball in M (G). (Author)
AD-643 446 Not available from CFSTI.

TOPOLOGY OF SOME SPHEROIDAL METRICS,
Maryland Univ., College Park. Dept. of Physics and Astronomy.
For primary bibliographic entry see Field 20J.
AD-643 451 Not available from CFSTI.

SOME INTEGRALS OF RAMANUJAN AND RELATED CONTOUR INTEGRALS,
Battelle Memorial Inst., Columbus, Ohio.
Van E. Wood. 6 Oct 65, 8p
AFOSR-66-2209
Grant AF-AFOSR-262-63
Availability: Published in Mathematics of Computation v20 n95 p424-9 Jul 1966.

Descriptors: (*Integrals, Theory), Numerical analysis, Graphics, Asymptotic series.

The properties and numerical values of Ramanujan's integral, its derivative and related contour integrals are discussed. Graphs of values are given. The integral arises in the solutions of diffusion and heat conduction problems for circular cylindrical coordinates. (Author)
AD-643 453 Not available from CFSTI.

PRODUCTS OF INDEPENDENT IDENTICALLY DISTRIBUTED STOCHASTIC MATRICES,
Brown Univ., Providence, R. I. Dept. of Applied Mathematics.
M. Rosenblatt. 1965, 10p
Contract Nonr-562 (29)
Availability: Published in Journal of Mathematical Analysis and Applications v11 n1-3 10p Jul 1965.

Descriptors: (*Stochastic processes, Matrix algebra), (*Combinatorial analysis, *Matrix algebra), Measure theory, Sequences, Topology.

The background and general content of the results obtained in a theorem on limit distributions of products of independent identically distributed elements of a compact semigroup is discussed. An effort is also made to determine the structure of completely simple semigroups of m x m stochastic matrices.
AD-643 458 Not available from CFSTI.

A COMPARISON THEOREM FOR ELLIPTIC DIFFERENTIAL EQUATIONS,
British Columbia Univ., Vancouver.
C. A. Swanson. 21 Oct 65, 9p
AFOSR-66-2269
Grant AF-AFOSR-379-65
Availability: Published in Proceedings of the American Mathematical Society v17 n3 p611-6 Jun 1966.

Descriptors: (*Theorems, *Partial differential equations), Polynomials, Functional analysis.

The paper generalizes a comparison theorem of Hatman-Winter, Leighton, Protter, Swanson and Clark to general second order linear elliptic equations. The known pointwise inequalities for the coefficients are replaced by a more general integral inequality. (Author)
AD-643 466 Not available from CFSTI.

ON THE CURVATURES OF RIEMANNIAN MANIFOLDS.

Interim rept.,
Massachusetts Inst. of Tech., Cambridge.
John A. Thorpe. 4 Mar 65, 9p
AFOSR-66-2270
Grant AF-AFOSR-335-63
Availability: Published in Illinois Journal of Mathematics v10 n3 p412-7 Sep 1966.

Descriptors: (*Algebraic topology, Theory), Differential geometry, Tensor analysis.
Identifiers: Manifolds (Mathematics).

The Lipschitz-Killing curvature K has an unwieldy algebraic expression in terms of the curvature tensor of X and it is not as yet well understood. In this note the author investigates the geometry of this curvature, continuing work begun in, and obtain certain partial results in the direction of the 'positive curvature implies positive characteristic' conjecture.
AD-643 474 Not available from CFSTI.

QUALITATIVE BEHAVIOUR OF SOLUTIONS OF NONLINEAR VOLTERRA EQUATIONS,
Wisconsin Univ., Madison. Dept. of Mathematics.
John A. Nohel. 1966, 36p
AFOSR-66-2770
Grant AF-AFOSR-925-65
Prepared in cooperation with Paris Univ. (France).
Availability: Published in Stability Problems of Solutions of Differential Equations. Proceedings of a NATO Advanced Study Inst. held in Padua (Italy) Sep 6-18 1966.

Descriptors: (*Integral equations, Asymptotic series), Integration, Differential equations, Stability, Time-lag theory.

The author discusses problems concerning the global behaviour of solutions of nonlinear Volterra equations which are closely related, at least conceptually, to problems of global existence, boundedness, stability and asymptotic behaviour of solutions of ordinary differential equations. For the latter the general theory is developed to a high degree as is evident from several articles of this volume; for Volterra equations such a general theory is at best fragmentary. He restricts himself to equations of convolution type as little beyond local classical existence and some boundedness results is known in the most general cases.
AD-643 482 Not available from CFSTI.

ON THE STATIONARY VALUES OF A SECOND-DEGREE POLYNOMIAL ON THE UNIT SPHERE,
Stanford Univ., Calif. Dept. of Computer Science.
George E. Forsythe, and Gene H. Golub. 19 Mar 65, 20p
Contract Nonr-225 (37)
Availability: Published in J Soc Indust Appl Math v13 n4 p1050-68 Dec 1965.

Descriptors: (*Polynomials, *Matrix algebra), Complex numbers, Real numbers, Number theory, Least squares method, Functions, Spheres.
AD-643 487 Not available from CFSTI.

PROGRESSING WAVES RADIATED FROM A MOVING POINT SOURCE IN AN INHOMOGENEOUS MEDIUM,
New York Univ., N. Y. Courant Inst. of Mathematical Sciences.
For primary bibliographic entry see Field 20N.
AD-643 488 Not available from CFSTI.

A GENERAL THEORY OF JORDAN RINGS.
Interim rept.,
Massachusetts Inst. of Tech., Cambridge. Dept. of Mathematics.
Kevin McCrimmon. 10 Aug 66, 11p
AFOSR-66-2768
Grant AF-AFOSR-335-63
Proceedings of the National Academy of Sciences v56 n4 p1072-9 Oct 1966.

Descriptors: (*Rings (Mathematics), *Theorems), Algebras.

It has long been felt that the definition of Jordan algebras in terms of the Jordan identity (x2,y,x) = 0 is unsuitable for algebras over fields of characteristic 2 or for rings in general; for example, in characteristic 2, it includes the 'wrong' algebras (nodal algebras) and excludes the 'right' algebras (Jordan matrix algebras). This note proposes a different definition based on the cubic composition U xy = 2x (x y) - x2 y instead of the bilinear composition x y. The goal is to show that this definition provides a better generalization of the classical theory, and to indicate for the resulting class of algebras a structure theory analogous to that of Professor N. Jacobson. (A full exposition will appear elsewhere.)
AD-643 492 Not available from CFSTI.

ROBUSTNESS OF THE STUDENT-PROCEDURE: A SURVEY.
Research rept.,
Connecticut Univ., Storrs. Dept. of Statistics.
Lawrence O. Haich, and Harry O. Posten. Aug 66, 69p RR-24
Contract Nonr-3292 (03)

Descriptors: (*Statistical tests, *Reviews), Analysis of variance, Statistical processes.
Identifiers: Robust procedures.

The paper surveys the approaches and results of various investigations of the effects of deviations from assumptions when the Student-procedure is used to test hypotheses on means (i.e., t-tests). It is an attempt to provide a complete summary of the literature including both theoretical and empirical studies. At the same time, it also provides a study of the general techniques used to investigate the robustness of other statistical procedures since these techniques are similar to those used for the Student-procedure. (Author)
AD-643 494 HC$3.00 MF$0.65

STABILITY OF NONLINEAR DISCRETIZATION ALGORITHMS.
Interim rept.,
Technische Hochschule, Munich (West Germany). Mathematisches Institut.
Hans J. Stetter. 1966, 15p
AFOSR-66-2378
Grant AF-EOAR-77-63
Availability: Published in Numerical Solution Partial Differential Equations p111-23 1966.

Descriptors: (*Algorithms, *Partial differential equations), Stability, Perturbation theory, Functional analysis, Nonlinear differential equations.

In the study of discretizations of partial differential equations, a phenomenon called 'nonlinear instability' has recently attracted increasing attention. It concerns the unstable behavior of a nonlinear discretization algorithm, the linearization of which at the true solution is perfectly stable. In some cases it has been observed that an 'explosion' of the computation occurred when the perturbation of the computation exceeded a certain threshold value while no instability was apparent for smaller perturbations. This paper attempts to show how this behavior of a nonlinear discretization is to be expected and may to some extent even be predicted from the structural relations between a nonlinear algorithm and its linearization. Also results of some experiments are discussed. (Author)
AD-643 510 Not available from CFSTI.

A RELATION INVOLVING HANKEL TRANSFORMS WITH APPLICATIONS TO BOUNDARY VALUE PROBLEMS IN POTENTIAL THEORY.
Interim rept.,
North Carolina State Univ., Raleigh. Applied Mathematics Research Group.
Ian N. Sneddon. 1965, 11p
AFOSR-66-2108
Contract AF 49 (638)-1159
Prepared in cooperation with Glasgow Univ. (Scotland). Dept. of Mathematics.
Availability: Published in Journal of Mathematics and Mechanics v14 n1 p33-40 Jan 1965.

Descriptors: (*Integral transforms, *Boundary value problems), (*Potential theory, *Electrostatic fields), Density, Disks, Elasticity, Thermal stresses.

A classical problem of mathematical physics is that of determining the potential of the electrostatic field due to a circular disk whose potential is prescribed. One method of solving this problem is to determine the charge density on the disk and then to calculate the potential at a field point r by evaluating a surface integral over the surface of the disk. In the case in which the prescribed potential of the disk is a function only of the distance from the center of the disk, it has been shown that the charge density can be computed. This paper shows that this representation of the charge density is a special case of a general relation between Hankel transforms which are of interest in the discussion of axisymmetric boundary value problems of potential theory are determined. (Author)
AD-643 563 Not available from CFSTI.

THE RELATION BETWEEN LOAD AND PENETRATION IN THE AXISYMMETRIC BOUSSINESQ PROBLEM FOR A PUNCH OF ARBITRARY PROFILE.
North-Carolina State Univ., Raleigh. Applied Mathematics Research Group.
For primary bibliographic entry see Field 20K.
AD-643 564 Not available from CFSTI.

THE STRESS ON THE BOUNDARY OF AN ELASTIC HALF-PLANE IN WHICH BODY FORCES ARE ACTING,
North Carolina State Univ., Raleigh. Applied Mathematics Research Group.
Ian N. Sneddon. 9 Sep 64, 10p
AFOSR-66-2113
Contract AF 49 (638)-1159
Availability: Published in Proceedings of the Glasgow Mathematical Association v7 pt1 p48-54 Jan 1965.

Descriptors: (*Stresses, *Boundary value problems), Elasticity, Potential theory, Integral transforms, Force (Mechanics).

In the paper the problem of determining the stress on the boundary y=0 of the elastic half plane y or = 0 when there are prescribed body forces acting in the interior and the boundary is free from applied stress is considered. The Laplace transform is used calculate the distribution of stress and the form of the displacement vector on the boundary. Also the basic formulae corresponding to an arbitrary distribution of body forces are derived. The forms of surface stress corresponding to three special cases are considered, namely, body forces acting in a direction normal to the boundary, point force, and body forces derivable from a potential function. Finally expressions are derived for the components of the surface displacement. (Author)
AD-643 566 Not available from CFSTI.

PROBABILISTIC COMPLETION OF A KNOCK-OUT TOURNAMENT,
Princeton Univ., N. J.
John A. Hartigan. 26 Aug 65, 10p
Contract Nonr-1858 (05)
Availability: Published in Annals of Mathematical Statistics v37 n2 p495-503 Apr 1966.

Descriptors: (*Game theory, *Probability), Statistical analysis.

A knockout tournament is a procedure for selecting the best among 2n players by, in the first round, splitting the 2n players into 2n-1 pairs who play each other; the 2n-1 winners proceed to the next round and repeat the process; finally the one player left is declared the best. A method is given for estimating a complete ranking of the 2n players given the results of the (2n - 1) matches in the tournament; the method is based on the assumption that all (2n) orderings of the players are equally probable before the tournament begins. (Author)
AD-643 574 Not available from CFSTI.

NOTE ON THE CONFIDENCE-PRIOR OF WELCH AND PEERS,
Princeton Univ., N. J.
J. A. Hartigan. Aug 65, 4p
Contract Nonr-1858 (05)
Availability: Published in The Journal of the Royal Statistical Society (Methodological) serB v28 n1 p55-6 1966.

Descriptors: (*Distribution theory, Probability), Statistical analysis.

Welch and Peers have shown that it is possible to determine a prior distribution for a one-dimensional parameter by requiring that the associated one-sided Bayes intervals are asymptotically confidence intervals. It is shown in the note that their procedure does not apply if certain natural two-sided Bayes intervals are used. (Author)
AD-643 575 Not available from CFSTI.

PROBLEMS IN THE THEORY OF PROBABILITY AND MATHEMATICAL STATISTICS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. N. Kolmogorov. 8 Dec 66, 9p FTD-HT-66-289
TT-67-60185
Problemy Teorii Veroyatnostei i Matematicheskoi Statistiki na Obshchem Sobranii Otdeleniya Matematiki, unedited rough draft trans. of Akademiya Nauk SSSR. Vestnik, v35 n5 p94-6 1965 (Sic).

Descriptors: (*Probability, Theory), Reviews, Statistical processes, Information theory, USSR.

This is a survey of research in the theory of probability. The works of several scientists in this field are cited. The 'Markovian' process is discussed. The application of mathematics to the different scientific fields is cited. (Author)
AD-643 595 HC$3.00 MF$0.65

REMARKS ON CARLEMAN'S FORMULA FOR FUNCTIONS IN A HALFPLANE,
Harvard Univ., Cambridge, Mass. Dept. of Mathematics.
Lars V. Ahlfors. 30 Jul 65, 7p
AFOSR-66-2422
Contract AF 49 (638)-1591
Availability: Published in J. Siam Number Anal v3 n2 p183-7 1966.

Descriptors: (*Functional analysis, Potential theory), Complex variables, Theorems.

Carleman's formula establishes a connection between the modulus and the zeros of an analytic function in a halfplane. Its relation to Poisson's integral formula was brought out by F. and R. Nevanlinna in a classical paper, 'Uber die Eigenschaften Analytischer Funktionen in der Ungebung einer Singularen Stelle oder Linie, Acta Soc. Sci. Fenn., 50 (1922), no. 5, and further analyzed by R. Nevanlinna in a more recent publication. Through past experience this author has found it more convenient to follow a modified version of the Nevanlinna approach that leads to a reformulation of Carleman's theorem as a remarkably smooth identity. Since this identity does not appear in leading texts on entire functions, it may be of some value to have the explicit formula reproduced in print. To stress the ramifications of the topic the author first derives the identify for harmonic functions, then notes that it can be replaced by an inequality for subharmonic functions, and finally generalizes the identity to arbitrary C2 functions. This greater generality is widely recognized, but seldom emphasized. (Author)
AD-643 658 Not available from CFSTI.

ON STREAMS OF EVENTS AND MIXTURES OF STREAMS.
Reprint series,
Research Triangle Inst., Durham, N. C. Statistics Research Div.
M. R. Leadbetter. Jun 65, 14p S-54
AFOSR-66-2079
Contract AF 49 (638)-1544
Availability: Published in Journal Royal Statistical Soc v28 n1 p218-27 1966.

Descriptors: (*Statistical processes, *Distribution functions), Measure theory, Stochastic processes, Queueing theory.

Distribution functions for streams of events (and, in particular, for the length of the interval 'between successive events') are defined within the framework of the theory of Khintchine (1955). Relationships such as that between the distributions for the length of an 'arbitrary interval' between successive events, the interval containing a fixed point and that of the time to the nth event after t = 0 are discussed briefly in this context. The definitions and results are extended to deal with mixtures of two streams, in which the events are alternately of opposite type. An important application concerns upcrossings and downcrossings of a level by a stationary stochastic process. (Author)
AD-643 680 Not available from CFSTI.

LOCAL MAXIMA OF STATIONARY PROCESSES.
Reprint series,
Research Triangle Inst., Durham, N. C. Statistics Research Div.
M. R. Leadbetter. 15 Jul 65, 9p S-53
AFOSR-66-2106
Contract AF 49 (638)-1544
Availability: Published in Proc Cambridge Phil Soc v62 p263-8 1966.

Descriptors: (*Statistical processes, *Distribution functions), Measure theory, Stochastic processes.

Two natural definitions for the distribution function of the height of an 'arbitrary local maximum' of a stationary process are given and shown to be equivalent. It is further shown that the distribution function so defined has the correct frequency interpretation, for an ergodic process. Explicit results are obtained in the normal case. (Author)
AD-643 682 Not available from CFSTI.

THE SENSITIVITY FUNCTION IN VARIABILITY ANALYSIS,
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Electrical Engineering.
Charles Belove. 27 Aug 65, 9p
AFOSR-66-2374
Contract AF 49 (638)-1373, DA-31-124-ARO (D)-316
Availability: Published in IEEE Transactions on Reliability vR15 n2 p70-6 Aug 1966.

Descriptors: (*Analysis of variance, Functions), Statistical analysis, Reliability, Series, Probability, Feedback, Networks, Sensitivity.

Methods of variability analysis include deterministic approaches, e.g., 'worst case' methods, 'Shmoo Plots', and probablistic approaches (Monte Carlo and Moment methods). Most of these use as a point of departure the Taylor Series expansion of the performance function about the nominal operating point with all but first-order terms neglected. The coefficients of the series are the partial derivatives of the performance function with respect to the components evaluated at the nominal operating point. These derivatives when properly normalized become the sensitivity functions used extensively in the study of feedback systems. The purpose of the paper is to bring together various results concerning sensitivity which are of direct use in variability analysis. One of the most useful of these is a relation concerning sensitivity sums which furnishes a valuable check on sensitivity calculation for homogeneous functions. Enough errors have been noted in recent literature to indicate that use of this check should become a routine part of variability analysis wherever it is applicable. Also included are applications to pole-zero sensitivity of electrical networks. (Author)
AD-643 714 Not available from CFSTI.

A DECOMPOSITION ALGORITHM FOR QUADRATIC PROGRAMMING.
Technical rept.,
Yale Univ., New Haven, Conn. Cowles Foundation for Research in Economics.
Andrew Whinston. 1966, 24p TR-67-2, Cowles foundation paper-239
Contract Nonr-3055 (01)
Prepared in cooperation with Virginia Univ., Charlottesville.
Availability: Published in Cahiers du Centre d'Etudes de Recherche Operationnelle v8 n2 p112-31 1966.

Descriptors: (*Algorithms, *Quadratic programming), Linear programming, Convex sets.

This paper presents one possible approach to solving a convex quadratic programming problem where the number of constraints is large, but of a special structure. In a problem with a large number of constraints a direct approach may be impossible since the size of the initial basis matrix would cause difficulty in determining its inverse. While in the present algorithm the dimensionality may increase one may always obtain, at worst, approximate solutions. (Author)
AD-643 724 Not available from CFSTI.

OPTIMAL STOPPING AND EXPERIMENTAL DESIGN.
Revised ed.,
Chicago Univ., Ill.
Gus W. Haggstrom. 10 Sep 65, 23p
Contract Nonr-2121 (23)
Revision of manuscript submitted 8 Mar 65.
Availability: Published in The Annals of Mathematical Statistics v37 n1 p7-29 Feb 1966.

Descriptors: (*Experimental design, *Game theory), (*Sequential analysis, Experimental design), Decision theory, Optimization, Control, Stochastic processes.

The problem of finding Bayes solutions for sequential experimental design problems motivates the study of the following type of one-person sequential game. If the game is stopped at any stage a, the loss to the player is the value of a random variable (rv), say Za. If the player chooses to continue the game, he can select the next rv to be observed from a class of rv's available at that stage, thus bringing the game to one of the stages succeeding stage a. (The class of all stages can be pictured as a 'tree'.) At this stage the player can again choose to stop, accepting the value of the chosen rv as his loss, or he may continue by selecting one of the class of rv's now available for the next observation. The player is required to stop sometime, and his decisions at any stage must depend only on information available at that stage. A model for this situation is given. Control variables, which correspond to stopping variables in the usual formulation of sequential games, are defined which can be used by the player to decide whether to stop

or not at any stage and, if he continues, which rv to observe next. A general characterization of control variables that minimize expected loss is given, and existence of such optimal control variables is proved under conditions applicable to statistical problems. The application to finding Bayes solutions to sequential experimental design problems is given.
AD-643 744 Not available from CFSTI.

CONSISTENCY PROOFS AND REPRESENTABLE FUNCTIONS. PART I.
Technical rept.,
Case Inst. of Tech., Cleveland, Ohio. Dept. of Mathematics.
C. F. Kent. Apr 66, 61p TR-3
Grant Nonr (G)-00077-64
See also AD-643 777.

Descriptors: (*Calculus of variations, Mathematical logic), (*Recursive functions, Theorems), Theory.

The paper lays a basis for studies of incompleteness phenomena manifest in analogues, within axiomatic theories, of known mathematical structures like the group of number theoretic permutations and the Boolean Algebra of subsets of the natural numbers. It establishes the basic facts about functions strongly represented by recursively enumerable formulas of number theory which are consequences of the usual constructive consistency proofs for arithmetic. To do this a pair of new normal form theorems for proofs in arithmetic are established by transfinite induction over the ordinals less than epsilon sub o. As consequences of these theorems, the usual statements of consistency are obtained, including Kreisel's no-counterexample interpretation by recursive functionals of finite type. (Author)
AD-643 776 HC$3.00 MF$0.65

CONSISTENCY PROOFS AND REPRESENTABLE FUNCTIONS. PART II. PROPERTIES OF STRONGLY REPRESENTABLE FUNCTIONS.
Technical rept.,
Case Inst. of Tech., Cleveland, Ohio. Dept. of Mathematics.
C. F. Kent. Nov 66, 110p TR-4
Grant Nonr (G)-00077-64
See also AD-643 776.

Descriptors: (*Calculus of variations, *Mathematical logic), (*Recursive functions, Theorems), Theory.

The paper continues the study of the limitations of axiomatic systems for the expression of classical mathematical truth. Particularly, the strong representability of functions and the provability of their true properties, in classical arithmetic, is investigated. To avoid known difficulties in formalizing recursion theory, a class of recursive defining equations is used which is: first, adequate for the definition of any strongly representable function and, second, allows number-theoretic deductions from the recursion equations to be replaced by theorems of arithmetic. This class is then used to establish, within arithmetic, results in the literature about arithmetic. (Author)
AD-643 777 HC$3.00 MF$0.65

INTEGRO-DIFFERENTIAL DELAY EQUATIONS OF POSITIVE TYPE,
Harvard Univ., Cambridge, Mass.
Garrett Birkhoff, and Leon Kotin. 11 Jul 65, 8p
Prepared in cooperation with Army Electronics Command, Fort Monmouth, N. J. Inst. for Exploratory Research.
Availability: Published in Journal of Differential Equations v2 n3 p320-27 Jul 1966.

Descriptors: (*Integral equations, *Differential equations), Initial value problems, Operators (Mathematics), Transformations (Mathematics), Theorems.

Results of previous investigations of the asymptotic behavior of solutions of the differential delay-equation are generalized to the more general Stieltjes integro-differential equation of Myschkis.
AD-643 799 Not available from CFSTI.

BAYESIAN ANALYSIS OF THE WEIBULL PROCESS WITH UNKNOWN SCALE PARAMETER.
Technical paper,
Research Analysis Corp., McLean, Va.
Richard M. Soland. Aug 66, 24p RAC-TP-215
Contract DA-44-188-ARO-1

Descriptors: (*Statistical analysis, *Decision making), (*Reliability, Probability), Sampling, Life expectancy, Failure (Electronics).
Identifiers: Bayesian analysis, Weibull process.

The Weibull process with unknown scale parameter is taken as a model for Bayesian decision making. The family of natural conjugate prior distributions for the scale parameter is exhibited and used in prior and posterior analysis. Preposterior analysis and several sampling schemes are then discussed. Preposterior analysis is given for a two-action problem with utility linear in the unknown mean of the Weibull process, in which the sampling scheme yields the first r failures in a life test of n items. An example is included. (Author)
AD-643 816 HC$3.00 MF$0.65

A BAYESIAN APPROACH TO SOME MISSING VALUE PROBLEMS IN ANOVA AND CONTINGENCY TABLES.
Technical rept.,
Johns Hopkins Univ., Baltimore, Md. Dept. of Statistics.
Daniel Bloch. Nov 66, 22p TR-62
Contract Nonr-4010 (09)

Descriptors: (*Decision theory, *Combinatorial analysis), Experimental design, Tables, Statistical tests, Statistical distributions.
Identifiers: Contingency tables.

Non-Bayesian procedures for dealing with missing values in ANOVA and contingency tables are well-known. This paper derives the appropriate Bayesian procedures for a randomized block design and for and r x c contingency table. The posterior distributions for the missing observation are given. This paper shows that the classical non-Bayesian procedures do have a simple and natural Bayesian interpretation. (Author)
AD-643 852 HC$3.00 MF$0.65

ON FINITE AND INFINITE SEQUENCES OF EXCHANGEABLE EVENTS.
Technical rept.,
Johns Hopkins Univ., Baltimore, Md. Dept. of Statistics.
David G. Kendall. Dec 66, 21p TR-64
Contract Nonr-4010 (09)
Prepared in cooperation with Cambridge Univ. (England).

Descriptors: (*Sequences, *Measure theory), Probability, Statistical distributions.

Finite and infinite sequences of exchangeable events are reviewed from a unified point of view, and versions of a Poisson limit theorem are proved for both the finite and the infinite case. The paper concludes with two open problems. (Author)
AD-643 860 HC$3.00 MF$0.65

APPROXIMATING THE BINOMIAL, F, AND COMMONLY USED RELATED DISTRIBUTIONS, I.
Technical rept.,
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
David B. Peizer, and John W. Pratt. Aug 66, 63p TR-12
Contract Nonr-1866 (37), Grant NSF-G-24035
Prepared in cooperation with Center for Advanced Studies in the Behavioral Sciences, Stanford, Calif., and MIT, see also AD-643 955.

Descriptors: (*Statistical distributions, *Approximation (Mathematics)), Mathematical logic, Binomials, Functional analysis, Tables.

The paper concerns a new Normal approximation to the beta distribution and its relatives, in particular, the binomial, Pascal negative binomial, F, t, Poisson, gamma, and chi square distributions. The approximate Normal deviates are expressible in terms of algebraic functions and logarithms, but for desk calculation it is preferable to use an equivalent expression in terms of a function specially tabulated here. The t distribution and its relatives are handled by a special method, for which further tables are given. Graphs of the error are provided. They show that the approximation is good even in the extreme tails except for beta distributions which are J or U shaped or nearly so, and they permit correction to obtain still more accuracy. Further graphs compare various Normal approximations. Some classical continued fractions and some standard recursive relations which may occasionally be useful are also given. Everything an ordinary user of the approximation might want to know is included in this paper. The theory behind the approximation and most proofs are postponed to a second paper immediately following this one (AD-643 955). (Author)
AD-643 954 HC$3.00 MF$0.65

APPROXIMATING THE BINOMIAL, F, AND COMMONLY USED RELATED DISTRIBUTIONS, II.
Technical rept.,
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
John W. Pratt. Aug 66, 54p TR-13
Contract Nonr-1866 (37), Grant NSF-G24035
See also AD-643 954.

Descriptors: (*Statistical distributions, *Approximation (Mathematics)), Mathematical logic, Binomials, Functional analysis, Tables.

The paper describes and derives the asymptotic behavior of the new Normal approximation introduced in Part I (AD-943 954) and of a family of Normal approximations based on roots, including the square root approximations of Fisher, and Freeman and Tukey, and the cube root approximations of Wilson and Hilferty, Camp, and Paulson. Various asymptotic comparisons are made, all of which rank the new approximation first, the cube root approximations second, and the other root approximations (and the ordinary Normal approximation) third. For instance, in the binomial case, if the tail probability is fixed as n approaches limit of infinity, the errors resulting from the foregoing approximations are generally of order n to the minus 3/2 power, /n, and n to the minus 1/2 power respectively, while for a tail probability approaching 0 the relative error in approximating it approaches 0, if the corresponding standard Normal deviate is of smaller order than n to the 1/2 power, n to the 1/4 power, of n to the 1/6 power respectively, but not generally otherwise. These comparisons are deduced from far more detailed results which are also given. (Author)
AD-643 955 HC$3.00 MF$0.65

AN EFFECTIVE ALGORITHM FOR MINIMIZATION,
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
A. A. Goldstein, and J. F. Price. Sep 66, 15p D1-82-0566, Mathematical note-483

Descriptors: (*Algorithms, *Functional analysis), Algebra, Optimization, Matrix algebra, Convergence, Effectiveness.

An algorithm is proposed for minimizing certain nice C2 functions f on En assuming only a computational knowledge of f and grad f. It is shown that the algorithm provides global convergence at a rate which is eventually superlinear and possibly quadratic. The algorithm is purely algebraic and does not require the minimization of any functions of one variable. Numerical computation on specific problems with as many as six independent variables has shown that the method compares very favorably with the best of the other known methods. The method is compared with the Fletcher and Powell method for a simple two dimensional test problem and for a six dimensional problem arising in control theory. (Author)
AD-643 973 HC$3.00 MF$0.65

A MULTIVARIATE NOTION OF ASSOCIATION FOR GENERAL RANDOM VARIABLES,
Boeing Scientific Research Labs., Seattle, Wash. Mathematics Research Lab.
J. D. Esary, Frank Proschan, and D. W. Walkup.
Oct 66, 15p D1-82-05-78, Mathematical note-490

Descriptors: (*Multivariate analysis, *Random variables), Set theory, Statistical distributions, Reliability, Stochastic processes.

In a previous paper (A multivariate notion of association, with a reliability application) random variables T1,T2,...,Tn were defined to be associated if each pair of non-decreasing functions F (T1,T2,...,Tn), G (T1,T2,...,Tn) have a non-negative covariance. The properties of this definition were studied in the case that T1,T2,...,Tn are finitely discrete, and a sample application to reliability theory was discussed. In the present paper several equivalent definitions of the same notion of association for unrestricted T1,T2,...,Tn are treated. The properties previously obtained, i.e. that association is preserved under the operations of extracting subsets, pooling independent sets, and forming sets of non-decreasing functions, are shown to hold in general. In addition, association is shown to be preserved under limits in distribution. Some additional applications of association are discussed, e.g. previously published results of A. W. Kimball and H. Robbins are obtained. (Author)
AD-643 976 HC$3.00 MF$0.65

ALGO PROCEDURES FOR THE FAST FOURIER TRANSFORM.
Research memo.,
Stanford Research Inst., Menlo Park, Calif.
Richard C. Singleton. Nov 66, 20p
See also AD-643 997.

Descriptors: (*Integral transforms, *Computer programs), Algorithms, Programming languages.

The report consists of six ALGOL procedures with comments. Procedure FASTTRANSFORM computes the complex finite Fourier transform or its inverse, using a modified version of the fast Fourier transform algorithm proposed by Cooley and Tukey. Procedure REALTRANSFORM similarly computes the real Fourier transform and inverse. The remaining four procedures are building blocks used in the first two procedures: they may be combined in other ways, for example, to form procedures for computing convolutions and power spectral density function estimates. The fast Fourier transform is a significant advance over previous methods, in that the number of arithmetic operations is proportional to n log2 n instead of n (2). Detailed methods of computing this transform are shown here in the language of ALGOL. A new approach to organizing the computations is used, one that makes practical the solution of large problems in which data overlay within high speed storage will occur. (Author)
AD-643 996 HC$3.00 MF$0.65

AN ALGOL PROCEDURE FOR THE FAST FOURIER TRANSFORM WITH ARBITRARY FACTORS.
Research memo.,
Stanford Research Inst., Menlo Park, Calif.
Richard C. Singleton. Dec 66, 12p
See also AD-643 996.

Descriptors: (*Integral transforms, *Computer programs), Algorithms, Programming languages.

The report consists of an ALGOL procedure with comments. This procedure computes the finite Fourier transform of an n-dimensional complex data vector, using a fast Fourier transform algorithm based on a method proposed by Cooley and Tukey. The dimension n is decomposed into its factors n = n sub 1 . n sub 2 . ... n sub m, and the transform is done in m steps, with n/n sub i transforms of dimension n sub i computed at the i (th) step. Except when n is a prime, the amount of computing is considerably less than for a single transform of dimension n. (Author)
AD-643 997 HC$3.00 MF$0.65

THE FAST FOURIER TRANSFORM.
Research Memo.,
Stanford Research Inst., Menlo Park, Calif.
Richard C. Singleton. Dec 66, 45p

Descriptors: (*Integral transforms, *Algorithms), Computer programs.

Good has proposed a fast algorithm for computing the complex Fourier transform x sub j = sum from k = o to N-1 of alpha sub k exp (i2 ps jk/N) for j = 0,1,... N-1, and Cooley and Tukey have restated the algorithm and reported major time savings in using it to compute large transforms on a digital computer. With N an integer power of two, computing time for this algorithm is proportional to N log2 N, a major improvement over other methods with computing time proportional to N (2). In this paper, the fast Fourier transform algorithm is discussed, and ALGOL procedures given for the basic method plus some of its variations. ALGOL procedures organized for efficient computing on a system with a virtual memory feature are given; these procedures reduce the need for moving portions of data arrays to and from high speed memory. A method for solving very large problems by use of auxiliary memory is also proposed. Methods of using the fast Fourier transform algorithm on real data are restated, and a way of reducing computing in this case is shown. A plan of scaling for computing the fast transform with fixed-point arithmetic is outlined; this method has been used on a small computer without floating-point hardware. (Author)
AD-643 998 HC$3.00 MF$0.65

A BOUNDARY PROBLEM CONNECTED WITH THE CALCULATION OF A PRISMATIC ELASTIC SHELL OF VARIABLE THICKNESS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20K.
AD-644 001 HC$3.00 MF$0.65

A STUDY OF CALL-BACK POLICIES IN SAMPLE SURVEYS.
Technical rept.,
Harvard Univ., Cambridge, Mass. Dept. of Statistics.
Poduri S. R. S. Rao. Jul 66, 56p TR-10
Contract Nonr-1866 (37)

Descriptors: (*Public opinion, Collecting methods), (*Factor analysis, Sampling), Mathematical models, Economics, Statistical analysis, Questionnaires.

Factors effecting the performance of a call-back policy are the response biases at successive calls, the available budget and planned sample size, the relative costs of repeated calls, and the desired level of accuracy. By using a mathematical model due to Deming and collecting numerical data on response rates and biases from surveys in practice, this paper presents a systematic evaluation of the effects of these factors and gives advice on the number of calls that should be prescribed for a proposed survey. (Author)
AD-644 017 HC$3.00 MF$0.65

SINGULAR PERTURBATIONS ON THE INFINITE INTERVAL.
Revised ed.,
Michigan State Univ., East Lansing.
Frank Charles Hoppensteadt. 13 Jan 66, 16p
AROD-3508:2
Contract DA-31-124-ARO (D)-268
Doctoral thesis. Revision of manuscript submitted 4 Oct 65.
Availability: Published in Transactions of the American Mathematical Society v123 n2 p521-35 Jun 1966.

Descriptors: (*Perturbation theory, *Initial value problems), Functions, Matrix algebra, Complex variables, Stability, Boundary layer.

The result of this paper is the best possible in the sense that the hypotheses cannot be substantially weakened. A series of examples accompanying the theorem investigates the possibility of altering the hypotheses.
AD-644 040 Not available from CFSTI.

EMBEDDING AND IMMERSION OF PROJECTIVE SPACES,
Northwestern Univ., Evanston, Ill.
J. Adem, S. Gitler, and M. Mahowald. 1966, 9p
AROD-4489:9
Contract DA-31-124-ARO (D)-144, Grant NSF-GP-2440
Availability: Published in Boletin de la Sociedad Matematica Mexicana p84-8 1966.

Descriptors: (*Algebra, *Projective geometry), Theorems, Topology.
Identifiers: Manifolds (Mathematics), Projective spaces.

Considerable progress has been made recently in the problem of embedding and immersing of manifolds. The families of projective spaces RP (n), CP (n) and QP (n)--the real, complex, and quaternionic, respectively--form an interesting collection of manifolds, since they seem to have embedding and immersion difficulties which are close to the worse possible for each dimension. For example, if n-2j or 2j + 1, the exact results for embedding all manifolds are known and RPn in each case proves that the result is best possible. In this note several theorems concerning the problem of embedding and immersion of manifolds are proven. (Author)
AD-644 049 Not available from CFSTI.

A MULTIVARIATE NOTION OF ASSOCIATION, WITH A RELIABILITY APPLICATION,
Boeing Scientific Research Labs., Seattle, Wash. Mathematical Research Lab.
J. D. Esary, Frank Proschan, and D. W. Walkup.
Oct 66, 26p D1-82-0567, Mathematical note-484

Descriptors: (*Multivariate analysis, *Random variables), (*Reliability, Multivariate analysis), Stochastic processes, Set theory.

Random variables T1,T2,...,Tn are, in this paper, associated if each pair of non-decreasing functions F (T1,T2,...,Tn), G (T1,T2,...,Tn) have a non-negative covariance. Association holds in cases ranging from T1,T2,...,Tn independent to T1,T2,...,Tn jointly restricted to a non-decreasing curve. Association is preserved under the standard multivariate operations of extracting subsets and pooling

independent sets; and under the special operation of forming sets of non-decreasing functions. Suitable choices of F,G lead to various inequalities for associated random variables. The properties of association are studied in the simple, but representative, case that T1,T2,...,Tn are finitely discrete. The notion of association is useful in extending the domain of validity of the minimal cut lower bound for the reliability of a coherent system, notably (here) to the case of repairable components with exponential times to failure and exponential times to repair. (Author)
AD-644 094 HC$3.00 MF$0.65

A GENERALIZED BIVARIATE EXPONENTIAL DISTRIBUTION,
Boeing Scientific Research Labs., Seattle, Wash. Mathematical Research Lab.
Albery W. Marshall, and Ingram Olkin. Oct 66, 24p D1-82-0572, Mathematical Note-486

Descriptors: (*Statistical distributions, *Distribution theory), Multivariate analysis, Reliability, Distribution functions.
Identifiers: Exponential distribution.

In a previous paper ('A Multivariate Exponential Distribution,' AD-634 335) the authors have derived a multivariate exponential distribution from points of view designed to indicate the applicability of the distribution. Two of these derivations are based on 'shock models' and one is bases on the requirement that residual life is independent of age. The practical importance of the univariate exponential distribution is partially due to the fact that it governs waiting times in a Poisson process. In this paper, the distribution of joint waiting times in a bivariate Poisson process is investigated. There are seveal ways to define 'joint waiting time.' Some of these lead to the bivariate exponential distribution previously obtained by the authors, but others lead to a generalization of it. This generalized bivariate exponential distribution is also derived from shock models. The moment generating function and other properties of the distribution are investigated. (Author)
AD-644 120 HC$3.00 MF$0.65

PATHS IN POLYTOPES: A SURVEY,
Boeing Scientific Research Labs., Seattle, Wash. Mathematical Research Lab.
Victor Klee. Nov 66, 80p D1-82-0579, Mathematical Note-491

Descriptors: (*Convex bodies, *Graphics), Linear programming, Convex sets, Reviews.
Identifiers: Convex polytopes.

This report surveys most of the existing knowledge concerning paths or circuits on convex polytopes, and it includes proofs or outlines of proofs for most of the important results in the field. Some of the problems discussed are related to linear programming (estimating the efficiency of various algorithms), to the four-color problem, to a classification scheme for organic compounds (desired, in particular, for efficient encoding of mass spectrograph readings sent from space vehicles) and to the encoding of certain analogue-to-digital conversion systems (used in telemetry for recording angles of displacement). The report is largely expository in nature and takes much of its material from earlier reports or papers by the author and other researchers. However, several new results are also included. In a slightly different form, the material presented will appear as two chapters of Branko Grunbaum's book on Convex Polytopes, to be published by John Wiley and Sons in 1966. (Author)
AD-644 121 HC$3.00 MF$0.65

A CONDITION FOR THE COMPLETENESS OF PARTIAL PREFERENCE ORDERS.
Research memo.,
Hebrew Univ., Jerusalem (Israel). Dept. of Mathematics.
David Schmeidler. Sep 66, 6p RM-22
Contract N62558-4355
Rept. on Research Program in Game Theory and Mathematical Economies.

Descriptors: (*Topology, Set theory), Game theory, Economics, Mathematical models.

A sufficient condition is given for a partial preference order on a connected topological space to be complete. The condition involves a continuity assumption and the assumption that any two points have a common upper bound. (Author)
AD-644 159 HC$3.00 MF$0.65

ADAPTIVE DECOMPOSITION OF SUPERPOSITIONS OF PROBABILITY DENSITY FUNCTIONS.
Technical rept.,
Rome Air Development Center, Griffiss AFB, N. Y.
John W. Sammon, Jr. Nov 66, 78p RADC-TR-66-540
Submitted in partial fulfillment of the requirements of the degree of Doctor of Philosophy in Electrical Engineering, Syracuse Univ., N. Y.

Descriptors: (*Pattern recognition, Decision theory), (*Probability density functions, Theory), Distribution theory, Statistical functions, Integral transforms, Mathematical models, Algorithms, Monte Carlo method, Information theory.

A method of approximating an ultradistribution is given in conjunction with the adaptive solution technique. An algorithm is developed for solving the multidimensional problem by first solving p + 1 one dimensional problems where p is the dimension of the sample vectors. Finally, a computer simulation of the adaptive technique was conducted on a sample problem where the elements of the mixture were selected as gaussian. The results of this experiment are reported.
AD-644 161 HC$3.00 MF$0.65

CONJUGACY TO UNITARY GROUPS WITHIN THE INFINITE-DIMENSIONAL SYMPLECTIC GROUP,
Argonne National Lab., Ill.
Irving E. Segal. Jun 66, 11p
Contract W-31-109-eng-38

Descriptors: (*Transformations (Mathematics), Operators (Mathematics)), (*Topology, Transformations (Mathematics)).

For abstract, see NSA 20 24.
ANL-7216 HC$3.00 MF$0.65

ESTIMATION OF PARAMETERS IN COMPOUND WEIBULL DISTRIBUTIONS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
L. W. Falls. 30 Mar 66, 43p NASA-TM-X-53422

Descriptors: *Digital computer, *Statistical analysis, *Weibull distribution, Analysis, Atmosphere, Compound, Computer, Digital, Distribution, Estimation, Life, Mathematics, Model, Parameter, Population, Statistical, Survival, Testing.

For abstract, see STAR 05 02.
N67-11352 HC$3.00 MF$0.65

SIP MATRIX INVERSION.
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
E. Y. Rodin. 23 Nov 65, 97p NASA-CR-79624, WR-65-38
Contract NAS8-11217

Descriptors: *Iteration, *Matrix algebra, Algebra, Computation, Inversion, Linear, Mathematics, Matrix, Symmetry, Zero.

For abstract, see STAR 05 02.
N67-11689 HC$3.00 MF$0.65

ANALOGIC DEVICE FOR STATISTICAL MEASUREMENTS OF CORRELATION IN TIME.
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 20D.
For abstract, see STAR 05 02.
N67-11917 HC$3.00 MF$0.65

ON THE CLASS OF ADMISSABLE NON-LINEARITIES FOR LUR'E'S PROBLEM.
Pennsylvania State Univ., University Park.
A. M. Krall. 1965, 5p NASA-CR-79765
Contract NGR-39-009-041

Descriptors: *Nonlinearity, *Problem solving, *Stability, Control, Equation, Function, Linear, Mathematics, Problem, Scalar, Solution, System.

For abstract, see STAR 05 02.
N67-12075 HC$3.00 MF$0.65

ROOT LOCUS ASYMPTOTES FOR THE SUM OF TWO POLYNOMIALS OF THE SAME DEGREE.
Pennsylvania State Univ., University Park.
A. M. Krall. 1966, 6p NASA-CR-79764
Contract NGR-39-009-041

Descriptors: *Asymptotic function, *Polynomial, *Theorem proving, Asymptote, Diagram, Locus, Parameter, Proving, Root, Sum, Theorem, Two.

For abstract, see STAR 05 02.
N67-12076 HC$3.00 MF$0.65

SOME INTEGRATION FORMULAE WHICH SIMPLIFY THE EVALUATION OF CERTAIN INTEGRALS IN COMMON USE BY ENGINEERS.
Wyle Labs., Inc., Huntsville, Ala.
M. J. Crocker, and R. W. White. Apr 66, 31p
NASA-CR-80096, WR-66-24
Contract NAS8-5384

Descriptors: *Integral, *Mathematics, Acoustics, Aerodynamics, Angle, Exponent, Formula, Induction, Integration, Phase, Polynomial, Table, Vibration.

For abstract, see STAR 05 02.
N67-12156 HC$3.00 MF$0.65

DETERMINATION OF HIDDEN EDGES IN POLYHEDRAL FIGURES. CONVEX CASE.
New York Univ., N. Y. Lab. For Electroscience Research.
P. Loutrel. Sep 66, 33p NASA-CR-80131, TR-400-145
Contract NGR-33-016-038

Descriptors: *Computer method, *Graph, *Polyhedron, Computer, Convexity, Edge, Face, Figure, Hiding, Line, Method, Problem, Solution.

For abstract, see STAR 05 02.
N67-12170 HC$3.00 MF$0.65

APPLICATION OF HASSE DIAGRAMS FOR COUNTING TOPOLOGIES ON FINITE SETS TECHNICAL REPORT NO. 14.
Kent State Univ., Ohio. Dept. Of Mathematics.
R. W. Piotrowski. Sep 66, 40p NASA-CR-80103, TR-14
Grant NSG-568

Descriptors: *Set theory, *Topology, Algebra, Closure, Count, Diagram, Enumeration, Finite, Method, Operator, Set, Theory.

For abstract, see STAR 05 02.
N67-12254 HC$3.00 MF$0.65

12B. OPERATIONS RESEARCH

THE MARKOV PROCESS ANALYSIS OF LUCHAK'S QUEUING MODEL.
Technical rept.,
Cornell Univ., Ithaca, N. Y. Dept. of Industrial Engineering and Operations Research.
N. U. Prabhu, and A. P. Lalchandani. Sep 66, 18p TR-16
Contract Nonr-401 (55), Grant NSF-GP-3783

Descriptors: (*Queueing theory, *Statistical processes), Model theory, Operations research.

Customers arrive in a Poisson process at a single-server queueing system and demand a random number of phases of service, each phase requiring a negative exponentially distributed time. This system is analyzed by considering the bivariate Markov process formed by the queue-length and the number of residual service phases of the customer at the counter. (Author)
AD-643 533 HC$3.00 MF$0.65

ON A SPECIAL CLASS OF CONSTRAINED GENERALIZED MEDIAN PROBLEMS.
Technical rept.,
Northwestern Univ., Evanston, Ill. Information-Processing and Control Systems Lab.
A. Charnes, M. J. L. Kirby, and W. M. Raike. Nov 66, 24p TR-66-107
Contracts DA-31-124-ARO (D)-322, N00014-66-C0020-A03

Descriptors: (*Mathematical programming, *Uncertainty), Distribution functions, Decision theory, Management engineering.
Identifiers: Chance-constrained programming.

By means of elementary properties of the absolute value function, important properties of a special class of 'constrained generalized median' problems (and eventually, the most general class, vide Charnes, Cooper, Thompson) such as existence of solutions, gradient and incremented formulae, linear programming and probabilistic interpretations are obtained for all classes of joint distribution functions for which the problems make sense. Results of A. C. Williams and R. Wets obtained by involved arguments and sophisticated constructs appear, when corrected, as special instances of some of the above results but devoid of the interrelations and interpretations presently adduced. (Author)
AD-643 557 HC$3.00 MF$0.65

THE LAGRANGE MULTIPLIER, A HEURISTIC PRESENTATION,
Operations Evaluation Group, Washington, D. C.
W. R. Nunn. 31 Oct 66, 40p OEG Research Contrib-76
Contract Nonr-3732 (00)

Descriptors: (*Numerical analysis, *Partial differential equations), Optimization, Functions, Set theory, Operations research.

Many problems in operations research require the maximization or minimization of a suitable payoff function subject to various constraints. Lagrange multipliers are classically used for this type of problem, however, the treatment given this technique by most texts requires that the payoff and constraint functions be at least differentiable at the extremizing point. This paper shows that the Lagrange multiplier concept can be independent of differentiability or even continuity of the functions involved. It also gives the reader a geometric insight into the workings of the multiplier. Simplifications possible, if the functions involved are homogeneous, are displayed. The treatment is heuristic rather than formally rigorous. (Author)
AD-643 740 HC$3.00 MF$0.65

ON DECISION THEORY UNDER COMPETITION,
California Univ., Los Angeles. Western Management Science Inst.
James R. Jackson. Oct 66, 44p WMSI Working Paper-109
Contract Nonr-233 (73)

Descriptors: (*Decision theory, Management planning), (*Reasoning, Decision theory), Game theory, Probability, Decision making, Mathematics, Economics, Operations research.

Games are studied in which a decision maker chooses an information function and a decision function. The information function generates a message based on the decision maker's opponent's action. The decision function generates a counteraction based upon the message. The payoff depends upon the action, the counteraction, and the message. Twenty zero-sum games are defined, differing in the decision maker's freedom to probability mix his choices and in his opponent's information about these choices. Relationships among these games are established which reduce the maximin and minimax theories of all of them to those of three games: one in which the decision maker cannot mix choices at all, and both his choices are observed by his opponent; one in which he can mix freely, and neither choice is observed; and one in which he can mix only decision functions, and only his information function is observed. The first two of these games are reduced, respectively, to the minorant and the rectangular game over a certain matrix, with rows corresponding to different decision functions. The third game is interpreted as a minorant game in which the decision maker chooses an information function and his opponent decides what message that function shall generate, followed by a small rectangular game (varying with the choices in the minorant game). These results are improved under the assumption that the payoff can be separated into two parts, one depending on the two players' actions and the other a 'message cost.'
AD-643 804 HC$3.00 MF$0.65

THE SLACKED UNCONSTRAINED MINIMIZATION TECHNIQUE FOR CONVEX PROGRAMMING.
Technical paper,
Research Analysis Corp., McLean, Va.
Anthony V. Fiacco, and Garth P. McCormick.
Aug 66, 21p RAC-TP-227
Contract DA-44-188-ARO-1

Descriptors: (*Nonlinear programming, Algorithms), (*Optimization, Nonlinear programming), Sequences, Functions, Equations, Theorems.
Identifiers: SUMT.

An algorithm for solving the problem: minimize f (x) (a convex function) subject to g sub i (x) or ± 0, i = 1, . . . , m (g sub i a concave function) is presented. Specifically the function P (x,t,r sub k) is identical with f (x) + 1/r sub k sigma (g sub i (x) - t sub i)squared is minimized over all x, nonnegative t, for a strictly decreasing null sequence (r sub k). It is proved that for every r sub k > 0, there exists a finite point (x (r sub k), t (r sub k)) which minimizes P and solves the convex programming problems as r sub k approaches 0. This algorithm is similar to the Sequential Unconstrained Minimization Technique (SUMT) found in a work by Fiacco and McCormick, in that it solves Wolfe's dual programming problem. It differs from SUMT in that (a) it approaches the optimum from the region of infeasibility (i,e., it is a relaxation technique), (b) it does not require a nonempty interior to the nonlinearly constrained region, (c) no separate feasibility phase is required before optimization takes place, and (d) the computational effort to solve the problem drastically reduced. (Author)
AD-643 817 HC$3.00 MF$0.65

THE SEQUENTIAL UNCONSTRAINED MINIMIZATION TECHNIQUE WITHOUT PARAMETERS.
Technical paper,
Research Analysis Corp., McLean, Va.
Anthony V. Fiacco, and Garth P. McCormick.
Aug 66, 19p RAC-TP-228
Contract DA-44-188-ARO-1

Descriptors: (*Nonlinear programming, Algorithms), (*Optimization, Nonlinear programming), Sequences, Functions, Theorems, Equations, Special functions (Mathematical).
Identifiers: SUMT.

For solving convex programming problems an unconstrained minimization technique that involves no parameter selection is presented. The iterations depend only on the initial value of the objective function. (Author)
AD-643 818 HC$3.00 MF$0.65

APPLICATION OF EQUIVALENT PROGRAMMING TO ALGORITHMIZATION OF CONTROL MACHINES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. T. Kulik. 8 Dec 66, 47p FTD-HT-66-516 TT-67-60266
Unedited rough draft trans. of mono. Vychislitelnaya Tekhnika dlya Automatizatsii Proizvodstva, Moscow, 1964 p49-82.

Descriptors: (*Algorithms, *Control systems), Programming (Computers), Model theory, Interpolation, Linear programming, Automation, USSR.

The problem of the mutual application of control machines and a system of control as a whole of the control machine and of the control algorithm is examined. The problem of simplifying the algorithm is of prime importance as compared with the opposite problem, the assuring of the adaptation of the machine to the algorithm. It is noted that a simple and general method of obtaining the optimal algorithm consists in the direct sorting out of equivalent algorithms and comparing them in accordance with a given criterion of optimal quality. It is shown that the concrete application of the approach under consideration to the equivalent programming requires study and development of the principles of improvement and methods of equivalent conversion of the algorithms. The author lists a number of general practical principles effective for a sufficiently wide class of algorithms. Methods of simplifying the algorithms given by differential equations (systems of control) based on the reduction to equivalent formulas are examined. Many formulas are used, and ten tables are given. One table shows the analogy existing between the indices of the quality of the systems (machines) intended for realization of the algorithms and the corresponding characteristics of the algorithm. (Author)
AD-643 995 HC$3.00 MF$0.65

CIRCULAR ERROR PROBABILITY OF A QUANTITY AFFECTED BY A BIAS,
Aeronautical Chart and Information Center, St. Louis, Mo. Geophysics and Space Sciences Branch.
Melvin E. Shultz. Jun 63, 33p
ACIC-Study-6

Descriptors: (*Circular error probable, Analysis), Statistical distributions, Errors, Probability, Target acquisition, Weapon systems.

A procedure for determining the radius of the 39.35, 50 and 90 per cent probability circles for a biased distribution is presented. Both circular

and elliptical normal bivariate distributions are considered. The elliptical distribution is replaced by an equivalent circular distribution and an approximate radius obtained, using the circular distribution procedure. Tables giving an indication of the error resulting from this displacement are included. (Author)
AD-644 106 HC$3.00 MF$0.65

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

JOURNAL OF ENGINEERING PHYSICS (SELECTED ARTICLES),
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20M.
AD-644 013 HC$3.00 MF$0.65

EVALUATION OF WIRELESS CONTROL SYSTEM FOR AIRPORT AIDS.
National Aviation Facilities Experimental Center, Atlantic City, N. J.
For primary bibliographic entry see Field 1E.
AD-644 018 HC$3.00 MF$0.65

13B. CIVIL ENGINEERING

CIVIL DEFENSE ASPECTS OF MUNICIPAL WATER SYSTEMS.
Final rept.,
Engineering-Science, Inc., Arcadia, Calif.
Judson A. Harmon. Nov 66, 32p
Contract PH-109-66-15

Descriptors: (*Water supplies, Urban areas), (*Civil defense systems, Water supplies), Nuclear warfare, Water pollution, Purification, Public health, Disasters, United States government, Water, Recovery.

This study considers the Civil Defense aspects of municipal water supply systems and develops a listing of significant considerations, technical data and information, to describe the capability of a system to recover and to continue to supply at least a minimum essential level of supply in the early post nuclear attack period.
AD-643 527 HC$3.00 MF$0.65

EFFECTS OF PARTICLE SIZE AND WAVE STATE ON GRAIN DISPERSION.
Chicago Univ., Ill. Fluid Dynamics and Sediment Transport Lab.
For primary bibliographic entry see Field 8C.
AD-643 824 HC$3.00 MF$0.65

CONSTANT PARAMETER STEADY-STATE DIFFUSION. ANALYTIC SOLUTIONS IN TWO AND THREE DIMENSIONS.
Pacific Missile Range, Point Mugu, Calif.
For primary bibliographic entry see Field 4A.
AD-644 151 HC$3.00 MF$0.65

RESULTS OF A PRELIMINARY SURVEY OF CANDIDATE COMMUNITIES FOR SALINE WATER DEMINERALIZATION APPLICATIONS.
Black and Veatch, Kansas City, Mo.
For primary bibliographic entry see Field 7A.
PB-173 673 HC$3.00 MF$0.65

13C. CONSTRUCTION EQUIPMENT, MATERIALS, AND SUPPLIES

COMPARISON OF PROPERTIES OF MASS CONCRETE CONTAINING 3- AND 6-IN. MAXIMUM SIZE, CRUSHED LIMESTONE COARSE AGGREGATE.
Technical rept.,
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
W. O. Tynes. Nov 66, 37p TR-6-748
Availability: U. S. Army Engineer Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss., $0.50.

Descriptors: (*Concrete, Mixtures), (*Cements, Concrete), Limestone, Wear resistance, Standards, Tensile properties, Permeability, Quality control.

A series of lean mass concrete mixtures containing crushed lime-stone aggregates graded either to the 3-in. or 6-in. size were proportioned with the same cement contents and with and without two pozzolanic admixtures. The mixtures were proportioned in accordance with ACI Standard Recommended Practice for Selecting Proportions for Concrete (ACI 613-54). These mixtures were tested to determine if the maximum size of coarse aggregate used in mass concrete could be reduced from 6 to 3 in. without adversely affecting the quality of the concrete. With the exception of workability, the tests made in this program indicated that the concrete containing 6-in. aggregate was superior to the concrete containing 3-in. aggregate.
AD-643 765 MF$0.65

13D. CONTAINERS AND PACKAGING

GUNFIRE TESTING.
Harrisburg Steel Co., Pa.
1966, 76p
Contract NObs-88222

Descriptors: (*Gas cylinders, Fragmentation), (*Tests, Fragmentation), Experimental data, Specifications, Steel, Military requirements, Terminal ballistics.

Tests were made to determine if compressed Gas Cylinder manufactured in accordance with I.C.C. Specification 3AA will provide cylinders that conform to non-shatterable requirements of MIL-C-22491.
AD-644 163 HC$3.00 MF$0.65

13E. COUPLINGS, FITTINGS, FASTENERS, AND JOINTS

AIRCRAFT CARGO RESTRAINT SYSTEM.
Final rept.,
All American Engineering Co., Wilmington, Del.
A. Russo. Sep 66, 177p
USAAVLABS-TR-66-50
Contract DA-44-177-AMC-68 (T)

Descriptors: (*Cargo, *Mechanical fasteners), (*Transport planes, Cargo), Army aircraft, Loading (Mechanics), Design, Vibration isolators.
Identifiers: Cargo restraint systems.

An investigation was made of the restraint requirements for Army cargo in Army aircraft, presenting realistic criteria for cargo restraint systems with the formulation of feasible restraint concepts. The existing static load factor criterion is shown to be insufficient. A dynamic analysis relates crash pulse criterion to restraint system deflection, leading to load limiting type energy absorber concepts. An effectiveness analysis is given of existing Army cargo restraint methods as presently employed, the same methods applied in a correct manner, and the proposed restraint system properly applied. (Author)
AD-643 520 HC$3.00 MF$0.65

THE DEVELOPMENT, DESIGN AND CONSTRUCTION OF A MAGNETIC SUSPENSION SYSTEM FOR THE R.A.E. 7 INCH x 7 INCH (18 x 18 cm) HYPERSONIC WIND TUNNEL.
Royal Aircraft Establishment, Farnborough (England).
For primary bibliographic entry see Field 14B.
AD-643 559 HC$3.00 MF$0.65

ESTABLISHMENT OF STANDARDIZATION DATA FOR MONEL AND K-MONEL FASTENERS.
Monthly status rept. no. 9, 1 Mar-29 Mar 65,
Value Engineering Co., Alexandria, Va.
E. Goodman, T. Hogland, and J. Miller. 6 Apr 65, 36p
Contract NObs-90493
See also AD-643 668.

Descriptors: (*Mechanical fasteners, Standardization), (*Fastenings, Performance (Engineering)), Loading (Mechanics), Torque, Studs, Locking fastener devices.

The purpose of testing performed in this task is (1) to determine thread distortion caused by various amounts of thread interference, (2) to evaluate changes in material as a result of thread interference, length of engagement, and axial stud loading to its breaking point, and (3) to produce comparative data on break-away torque and prevailing back-out torque of the stud, and corresponding torques for backing off self locking nuts.
AD-643 663 HC$3.00 MF$0.65

ESTABLISHMENT OF STANDARDIZATION DATA FOR MONEL AND K-MONEL FASTENERS,
Value Engineering Co., Alexandria, Va.
E. Goodman, T. Hogland, and J. Miller. 21 Apr 65, 10p Rept. no. 4-RD-65
Contract NObs-90493
Rept. includes supplementary letter report. See also AD-643 663.

Descriptors: (*Mechanical fasteners, Standardization), (*Fastenings, Performance (Engineering)), Studs, Tensile properties, Micrometers, Loading (Mechanics), Stresses.

The object of this study is to set dimensional requirements for monel and K-monel studs which will have uniform energy absorption along their entire length. The testing in this task, therefore, must generate data which will give the equivalent tensile stress area of the unengaged threaded portion of the stud.
AD-643 664 HC$3.00 MF$0.65

ESTABLISHMENT OF STANDARDIZATION DATA FOR MONEL AND K-MONEL FASTENERS,
Value Engineering Co., Alexandria, Va.
E. Goodman, T. Hogland, and J. Miller. 22 Apr 65, 27p Rept. no. 6-RD-65
Contract NObs-90493
Rept. includes supplementary letter report. See also AD-643 664.

Descriptors: (*Mechanical fasteners, Standardization), (*Fastenings, Performance (Engineering)), Plasticity, Studs, Loading (Mechanics), Deformation, Failure (Mechanics).

The purpose of the testing performed in this task is to determine the minimum length of engagement

of studs necessary so that there will be no plastic deformation, in shear, of the internal threads when the stud is loaded to its breaking point. Data must be applicable to the following material combinations: K-Monel studs in Monel castings; K-Monel studs in high tensile steel (HTS) plate; K-Monel studs in HY80 steel plate; K-Monel studs in HY80 steel casting; Monel studs in high tensile steel (HTS) plate; Monel studs in HY80 steel plate. When failure of a thread assembly occurs it is desirable that breaking of the stud occurs rather than the stripping of the external or internal threads. In other words, the length of thread engagement should be sufficient to develop the full strength of the stud.
AD-643 665 HC$3.00 MF$0.65

ESTABLISHMENT OF STANDARDIZATION DATA FOR MONEL AND K-MONEL FASTENERS,
Value Engineering Co., Alexandria, Va.
E. Goodman, T. Hogland, and J. Miller. 26 Apr 65, 21p Rept. no. 7-RD-65
Contract NObs-90493
See also AD-643 665.

Descriptors: (*Mechanical fasteners, Standardization), (*Fastenings, Performance (Engineering)), Loading (Mechanics), Torque, Locking fastener devices, Studs.

The purpose of testing performed in this task is (1) to determine thread distortion caused by various amounts of thread interference, (2) to evaluate changes in material as a result of thread interference, length of engagement, and axial stud loading to its breaking point, and (3) to produce comparative data on break-away torque and prevailing back-out torque of the stud, and corresponding torques for backing off self locking nuts.
AD-643 666 HC$3.00 MF$0.65

ESTABLISHMENT OF STANDARDIZATION DATA FOR MONEL AND K-MONEL FASTENERS,
Value Engineering Co., Alexandria, Va.
E. Goodman, T. Hogland, and J. Miller. 27 Apr 65, 102p Rept. no. 8-RD-65
Contract NObs-90493
See also AD-643 666.

Descriptors: (*Mechanical fasteners, Standardization), (*Fastenings, Performance (Engineering)), Bolts, Torque, Locking fastener devices, Micrometers.

The report standardizes method for assuring proper bolt tension. Prestressing experiments include the micrometer, torque measurement, and angular turn of the nut methods. Both through bolting and set-stud bolting assemblies are investigated.
AD-643 667 HC$3.00 MF$0.65

ESTABLISHMENT OF STANDARDIZATION DATA FOR MONEL AND K-MONEL FASTENERS,
Value Engineering Co., Alexandria, Va.
E. Goodman, T. Hogland, and J. Miller. 28 Apr 65, 9p Rept. no. 9-RD-65
Contract NObs-90493
See also AD-643 667.

Descriptors: (*Mechanical fasteners, Standardization), (*Fastenings, Performance (Engineering)), Studs, Castings, Mechanical properties, Porosity.

The purpose of this task is to obtain data on which to base thread dimensions for 8UN interference-fit threads. The major diameter, minor diameter, and pitch diameter for external and internal threads for sizes 1 to 2 inches are to be determined. These dimensions are to be determined for monel studs engaged in tapped holes in HTS and HY80 plate and K-monel studs engaged in tapped holes in HTS and HY80 plate and monel and HY80 castings.
AD-643 668 HC$3.00 MF$0.65

GLUE-WELD JOINTS IN MACHINE BUILDING,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. G. Kanter, V. N. Shavyrin, N. Kh. Andreev, and L. S. Feldman. 26 May 66, 154p FTD-MT-65-279
TT-67-60317
Edited machine trans. of mono. Kleesvarnye Soedineniya v Mashinostroenii, Kiev, 1964 200p.

Descriptors: (*Aluminum alloys, *Joints), USSR, Bonded joints, Welds, Adhesives, Welding, Bonding, Tensile properties, Shear stresses, Compressive properties, Fatigue (Mechanics), Loading (Mechanics), Defects (Materials), Quality control, Automation.

The book contains generalized results of scientific research and experimental work on the use of glued and welded joints in strengthening structure from highly durable aluminum alloys. The basic attention is allotted to the technology of the manufacture of glue-weld joints, the development of the glue compositions, application of glues, preparation of the surface for welding, anticorrosive protection of glue-weld joints and also the creation of means of mechanization and automation of the technology process of manufacture of glue-weld joints and the determination of technical and economic indices. Comparative characteristics of the strength of welded and glue-weld joints under static and cyclic loads in conditions of normal and raised temperatures are given. (Author)
AD-644 146 HC$3.00 MF$0.65

13G. HYDRAULIC AND PNEUMATIC EQUIPMENT

DEVELOPMENT OF HIGH SPEED FLUERIC LOGIC CIRCUITRY FOR A NOVEL PNEUMATIC STEPPING MOTOR.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
W. C. Cooley, and W. S. Griffin. 1966, 38p NASA-TM-X-52250
To Be Presented At The Symp. On Fluidics, Lafayette, Ind., 8-10 May 1967, Sponsored By Am. Soc. Of Mech. Engr. And Hdl

Descriptors: *Logic circuit, *Pneumatic equipment, Actuator, Amplifier, Circuit, Cylinder, Equipment, High speed, Logic, Motor, Piston, Pneumatic, Power, Pulse, Step, Stepper motor.

For abstract, see STAR 05 02.
N67-11333 HC$3.00 MF$0.65

VORTEX VALVE PERFORMANCE POWER INDEX.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
V. D. Gebben. 1966, 20p NASA-TM-X-52257
To Be Presented At The Symp. On Fluidics, Lafayette, Ind., 8-10 May 1967, Sponsored By Am. Soc. Of Mech. Engr. And Hdl

Descriptors: *Power supply, *Valve, *Vortex, Consumption, Efficiency, Flow, Index, Inlet, Nozzle, Performance, Power, Pressure, Radial, Supply, Tangent.

For abstract, see STAR 05 02.
N67-11338 HC$3.00 MF$0.65

HYDRAULIC FLUID INTERACTION SERVOVALVES MONTHLY TECHNICAL REPORT, 1 FEB. - 1 MAR. 1966.
Bendix Corp., Southfield, Mich. Research Labs. Div.
A. Blatter. 1 Mar 66, 24p NASA-CR-79761, REPT.-3371
Contract NAS8-11928

Descriptors: *Hydraulic valve, *Servomechanism, Design, Environment, Fluid, Interaction, Motor, State, Technology, Testing, Torque, Valve, Vortex.

For abstract, see STAR 05 02.
N67-12079 HC$3.00 MF$0.65

13H. INDUSTRIAL PROCESSES

HYDROGEN PERMEATION MEASUREMENTS ON SOME ELECTRODEPOSITED PROTECTIVE COATINGS FOR HIGH STRENGTH STEELS.
Technical rept.,
Royal Aircraft Establishment, Farnborough (England).
H. C. Davis, and Josephine A. Gray. Jun 66, 25p TR-66176

Descriptors: (*Steel, Protective treatments), (*Metal coatings, Permeability), Hydrogen, Electrodeposition, Cadmium, Plating, Zinc alloys, Nickel alloys, Great Britain, Nickel, Cadmium alloys, Measurement.

The Report describes the apparatus used and measurements made to determine whether certain standard and special electrodeposited coatings were permeable to hydrogen. Cadmium plating to specification DTD904 showed no measurable permeability at either 30 or 200C. Coatings produced by the Cleveland cadmium plating process were also found to be impermeable at both temperatures, apparently due to a dense layer formed during the early stages of plating. A zinc-nickel alloy electrocoating containing approximately 18% nickel showed no measurable permeability at 30C, but a small permeability was obtained at 200C and this might prove sufficient to allow hydrogen contents to be reduced below embrittling levels. (Author)
AD-643 535 HC$3.00 MF$0.65

OPERATING COMPUTER SYSTEM 'PROKAT',
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. S. Nikolaev, and V. L. Epshtein. 8 Dec 66, 15p FTD-HT-66-613
TT-67-60193
Unedited rough draft trans. of mono. Avtomaticheskoe Operativnoe Upravlenie Prizyoostvennymi Protsessami, Moscow, 1965 p134-40.

Descriptors: (*Rolling (Metallurgy), *Automation), (*Computers, Industrial plants), Operation, Control systems, USSR.
Identifiers: PROKAT.

Because of the high cost of operating industrial plants, computers are necessary for the simultaneous control of the different departments making up the whole operation. A large amount of information must be stored in the computers. This report concerns the Controlling Computational Complex (PROKAT). At first the problem of industrial control was analyzed with a complex of computers. Losses and reserves of the metallurgical manufacturing process were evaluated. Solving this problem should lead to an increase in the heating pit temperature and productivity, and a reduction in specific fuel consumption and machine idling. A profit graph is shown which does not consider personnel reduction. The Martin shop's use of a computer is described. PROKAT has five automatic local control systems, a centralized information system and a central control calculation machine. Local automatic controls control each section; the centralized control assures assembly, information accumulation, processing and docu-

mentation, while the calculating machine regulates the interaction of the different sections. The different functions are listed. A comparison of humans with the machines is given along with a specific operational description. (Author)
AD-643 623 HC$3.00 MF$0.65

QUALITY CAN BE CONTROLLED,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
B. Gnedenko, and Ya Sorin. 7 Dec 66, 10p FTD-HT-66-230
TT-67-60197
Unedited rough draft trans. from Izvestiya (USSR) 21 Jul p3 1964.

Descriptors: (*Quality control, Industrial production), (*Management planning, Production control), Reliability, Standards, Life expectancy, Management control systems, Economics, Costs.

This article summarizes the shortcomings of Soviet industries in putting out inferior production goods with an emphasis in industry's converting to the 'Saratov system' for better quality control. Specific examples of inferior goods are cited with an emphasis on the benefit of the consumer.
AD-643 627 HC$3.00 MF$0.65

THERMOMECHANICAL PROCESSING OF STAMPINGS OF VT14 ALLOY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. N. Kaganovich, Yu. I. Potapenko, and E. D. Igumenshchev.7 Dec 66, 11p FTD-HT-66-213
TT-67-60214
Termomekhanicheskaya Obrabotka Shtampovok Splava VT14, unedited rough draft trans. of Tsvetnye Metally (USSR), v38 n10 p75-9 1965.

Descriptors: (*Hot working, *Titanium alloys), Mechanical properties, Aging (Materials), Hot pressing, USSR.

The purpose of this report was to explain the possibility of obtaining stable properties of goods from the VT14 alloy, prepared under conditions of series manufacture by thermomechanical processing. The use of thermomechanical processing with hot stamping improves the mechanical properties of the VT14 alloy, above all its plasticity. It raises the stability of the elongation factors, narrowing and impact viscosity. The increased plasticity of the VT14 alloy after thermomechanical processing appears to be the result of a greater dispersion of structural components, causing a greater number of possible sliding planes and doubling and a more uniform distribution of the same over the entire metal in the process of deformation or elongation. When evaluating the advisability of using thermomechanical processing, it is necessary to consider the reduced hardening of the VT14 alloy. In simple form details, when a high deformation degree is fulfilled, at a low temperature, the high properties can be assured at an ordinary stamping technology. (Author)
AD-643 629 HC$3.00 MF$0.65

METHODS OF IMPROVING THE HEAT-RESISTANT PROPERTIES OF MATERIALS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11F.
AD-643 726 HC$3.00 MF$0.65

AUTOMATION, VOL. 3, NO. 3, 1960: SELECTED ARTICLES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
20 Sep 66, 12p FTD-TT-66-45
TT-67-60251
Edited trans. of Tzu Tung Hua (Chinese People's Republic), v3 n3 p114-8 1960.

Descriptors: (*Remote control systems, *Automation), Measurement, Instrumentation, China, Electrical equipment, Symposia, Systems engineering.

Contents: Initiation of pilot production of short-range remote measurement equipment at the Shanghai electrical instruments plant; The First National Convention on remote-control engineering.
AD-643 731 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE, TRANSISTOR TYPE POTENTIOMETERS.
CTS Corp., Elkhart, Ind. Research and Development Div.
For primary bibliographic entry see Field 14B.
AD-643 778 HC$3.00 MF$0.65

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
Radio Corp. of America, Somerville, N. J. Defense Microelectronics.
For primary bibliographic entry see Field 9A.
AD-643 779 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE FOR RUBY LASER RODS.
Union Carbide orp., East Chicago, Ind. Electronics Div.
For primary bibliographic entry see Field 20E.
AD-643 859 HC$3.00 MF$0.65

ANNUAL REPORT ON SPUTTERING, NOVEMBER 1966.
Rept. for 1 Nov 65-31 Oct 66,
Litton Systems, Inc., Minneapolis, Minn. Applied Science Div.
G. S. Anderson, G. V. Jorgenson, and G. K. Wehner. 8 Dec 66, 53p Rept. no. 3047
Contract Nonr-1589 (15)
See also AD-625 776.

Descriptors: (*Sputtering, Performance (Engineering)), Ion bombardment, Atoms, Ejection, Energy, Alloys.

Relative sputtering yields were determined for variously oriented Ge surfaces above and below the annealing temperature. The yield for Ge (100) was found to be higher for an ordered surface than for a damaged surface. The opposite is true in the case of Ge (110) and no change was observed for Ge (111). Alloy targets were sputtered to determine the amount of sputtering required to reach equilibrium conditions, where material is removed in the same proportions as the bulk. This produces a target surface layer of altered composition. In alloys of 55% Cu and 45% Ni, and of 90% Ni and 10% Ti, it appears that an equivalent of 10-20 atomic layers must be removed before equilibrium conditions are reached at bombarding ion energies of 500-1000 eV. Simultaneous sputtering of two targets with widely different yields produces some puzzling results. Only a small number of atoms from the low yield target, when deposited on the high yield target, produce a surface covered with cones and this results in a sizeable reduction in sputtering yield. A quadrupole mass filter system for analysis of sputtered material has been assembled and tested. (Author)
AD-643 920 HC$3.00 MF$0.65

MATHEMATICAL MODEL AND CALCULATOR FOR OPTIMUM DIVISION OF ROLLED MATERIAL,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
P. Caslavsky, and A. Vanecek. 27 Sep 66, 12p
FTD-HT-66-163
Unedited rough draft trans. of Hutnicke Listy (Czechoslovakia) n10 p711-14 1964.

Descriptors: (*Rolling mills, Control systems), Mathematical models, Optimization, Cutting, Counting methods, Czechoslovakia.

Contents: System of optimum division, Mathematical model, Control of an optimalization counter.
AD-643 967 HC$3.00 MF$0.65

THE PRODUCTION OF SOFT-MAGNETIC MATERIALS BY THE METHOD OF POWDER METALLURGY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11G.
AD-644 048 HC$3.00 MF$0.65

GLUE-WELD JOINTS IN MACHINE BUILDING,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 13E.
AD-644 146 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE CRYSTAL UNIT CR- (XM-56)/U.
Lewis (E. B.), Inc., East Hartford, Conn.
For primary bibliographic entry see Field 9E.
AD-644 158 HC$3.00 MF$0.65

STUDY OF NON-DESTRUCTIVE MEASURING OF CASE DEPTH AND CASE HARDNESS.
Sperry Products, Inc., Danbury, Conn.
For primary bibliographic entry see Field 14B.
AD-66 027 HC$3.00

A STUDY OF EMBEDMENT AND OTHER METALLURGICAL AND MECHANICAL CHARACTERISTICS OF CROSS-WIRE RESISTANCE WELDS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. A. Munford. Nov 66, 27p NASA-TN-D-3714
Contract 125-25-04-01-51

Descriptors: *Electronic equipment, *Resistance, *Welded joint, Aerospace, Cross, Electrode, Electronic, Embedding, Equipment, Force, Fusion, Joint, Metallurgy, Nickel, Shear, Strength, Torsion, Welding, Wire.

For abstract, see STAR 05 02.
N67-11327 HC$3.00 MF$0.65

MATERIALS FOR POTASSIUM LUBRICATED JOURNAL BEARINGS QUARTERLY PROGRESS REPORT NO. 11, OCT. 22, 1965 - JAN. 22, 1966.
General Electric Co., Cincinnati, Ohio. Space Power And Propulsion Section.
R. G. Frank. 22 Jan 66, 131p NASA-CR-72028
Contract NAS3-2534

Descriptors: *Journal bearing, *Potassium, *Shaft, *Turbogenerator, Alloy, Compatibility, Corrosion, Diffraction, Flow, Friction, Lubrication, Microhardness, Molybdenum, Niobium, Rotation, Spectrography, Test, Water, Wear, Wetting, X-ray, Zirconium.

For absiract, see STAR 05 02.
N67-11349 HC$3.00 MF$0.65

FABRICATION OF A BERYLLIUM TEST PANEL.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
G. H. Jones, and C. M. Wood. 29 Oct 66, 37p
NASA-TM-X-53529

Descriptors: *Beryllium, *Manufacturing, *Sheet metal, Application, Assembly, Etching, Forming, Hardware, Machining, Metal, Panel, Precision, Sheet, Structural, Technique, Test, Tooling.

For abstract, see STAR 05 02.
N67-11824 HC$3.00 MF$0.65

LUBRICATION, CORROSION AND WEAR - A CONTINUING BIBLIOGRAPHY WITH INDEXES, APRIL 1965 - AUGUST 1966.
National Aeronautics And Space Administration, Washington, D. C.
Oct 66, 302p NASA-SP-7020/01/

Descriptors: *Bibliography, *Lubrication system, *Metal corrosion, Annotation, Bearing, Corrosion, Cracking, Fatigue, Lubrication, Material, Metal, Stress, Supplement, System, Wear.

For abstract, see STAR 05 02.
N67-11944 HC$3.00 MF$0.65

SATURN V, S-IC Y-RING ELECTRON BEAM WELDING SYSTEM.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
M. W. Brennecke, R. V. Hoppes, and W. P. Stanton. 30 Mar 65, 89p NASA-TM-X-57109, R-ME-IN-65-4

Descriptors: *Electron beam welding, *Saturn s-ic stage, Beam, Chamber, Electron, Electronic, Joining, Ring, Segment, System, Tooling, Vacuum, Welding.

For abstract, see STAR 05 02.
N67-11963 HC$3.00 MF$0.65

INVESTIGATION, TESTING, AND SELECTION OF SLIP-RING LEAD WIRES FOR USE IN HIGH-PRECISION SLIP-RING CAPSULES FINAL REPORT.
Battelle Memorial Inst., Columbus, Ohio.
E. S. Bartlett, R. H. Ernst, and D. N. Williams.
15 Sep 66, 115p NASA-CR-80081
Contract NAS8-20188

Descriptors: *Corrosion resistance, *Saturn launch vehicle, *Silver alloy, *Wire, Alloy, Assembly, Conductivity, Control, Copper, Corrosion, Electric, Evaluation, Guidance, Insulation, Niobium, Resistance, Ring, Silver, Slip, Strength, System, Teflon.

For abstract, see STAR 05 02.
N67-12070 HC$3.00 MF$0.65

MANUFACTURING ENGINEERING LABORATORY'S WELD ENVIRONMENTAL CONTROL.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
D. M. Daley. Jan 64, 11p NASA-TM-X-59978
Presented To The 1st S-iv, S-iv-b Mewgm, 15-16 Jan. 1964

Descriptors: *Environmental control, *Saturn s-ic stage, *Structural engineering, Atmospheric, Bulkhead, Control, Dirt, Engineering, Environment, Fabrication, Humidity, Optimization, Saturn, Space, Structural, Temperature, Vehicle, Welding, Wind.

For abstract, see STAR 05 02.
N67-12231 HC$3.00 MF$0.65

BRAZING AND BRAZING ALLOYS - A BIBLIOGRAPHY.
National Aeronautics And Space Administration, Washington, D. C.
1966, 59p NASA-SP-5026

Descriptors: *Alloy, *Bibliography, *Brazing, *Industry, Aerospace, Evaluation, Fabrication, High temperature, Low temperature, Refractory, Technology, Testing, Welding.

For abstract, see STAR 05 02.
N67-12279 HC$3.00 MF$0.65

13I. MACHINERY AND TOOLS

DEVELOPMENT OF RAPID SHUTDOWN TECHNIQUES FOR CRITICAL INDUSTRIES,
Stanford Research Inst., Menlo Park, Calif.
Fred R. McFadden, and Charles D. Bigelow. Jan 66, 106p
Contract OCD-PS-64-201 (32)

Descriptors: (*Industrial plants, Safety), Industrial equipment, Nuclear warfare, Control systems, Costs, Operation, Refineries, Steel industry, Cost effectiveness.

In the event of a nuclear attack, considerable damage may result in many industries due to rapid emergency shutdown or abandonment of facilities. The process industries--including petroleum, petrochemical, and basic metals--are particularly vulnerable to shutdown damage. Sources of such damage include fires and explosions, thermal stress, and solidification of materials in vessels and pipes. Although petroleum refineries have been shut down rapidly in emergencies, such shutdowns are dangerous and may lead to extensive damage of equipment. In many refineries there is a reasonable prospect of improving the capability for rapid shutdowns through relatively modest expenditures in control equipment. Steel furnaces are particularly vulnerable to rapid shutdown. Although improvements are possible, their costs appear sizable compared with initial construction costs.
AD-643 573 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AIR BEARING ROCKET SLED SLIPPERS.
Kaman Aircraft Corp., Bloomfield, Conn.
For primary bibliographic entry see Field 14B.
AD-643 756 HC$3.00 MF$0.65

DEVELOPMENT AND QUALIFICATION OF IGNITION ELEMENT, ELECTRICAL, XM47.
Frankford Arsenal, Philadelphia, Pa.
For primary bibliographic entry see Field 19A.
AD-643 950 HC$3.00 MF$0.65

THE CALCULATION AND DESIGN OF CYLINDRICAL MATRICES OF STAMPS FOR COLD PRESSING WITH HARD-ALLOY INSERTS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. A. Mishunin. 27 Sep 66, 16p FTD-HT-66-398 TT-67-60302
Unedited rough draft trans. of Kuznechno-Shtampovochnoe Proizvodstvo (USSR), v7 n1 p5-9 1965.

Descriptors: (*Dies, Press forging), Cold working, Design, Steel, Chromium alloys, Tungsten compounds, Carbides, Cylindrical bodies, USSR, Stresses, Tolerances (Mechanics).

The partial failures in putting the process of cold pressing into production are connected with the low resistance and frequent breakdowns of the instrument. Most recommendations lack calculation-supported data on the selection of the ratio of the geometric parameters of the matrix elements, the clearances on adjacent surfaces, and the optimal design diagram. A method is discussed for calculating and selecting the design diagrams of cylindrical matrices of stamps for cold pressing with hard-alloy inserts which overcomes this obstacle and gives practical aid to factory designers and technicians.
AD-644 050 HC$3.00 MF$0.65

HYDRODYNAMIC JOURNAL BEARING PROGRAM QUARTERLY PROGRESS REPORT NO. 2, JUL. 29 - OCT. 29, 1965.
General Electric Co., Cincinnati, Ohio. Research And Development Center.
H. C. Lee, J. D. Mc Hugh, H. E. Nichols, and W. D. Richards. 18 Apr 66, 85p NASA-CR-72033
Contract NAS3-6479

Descriptors: *Computer program, *Hydrodynamics, *Journal bearing, *Spacecraft power supply, Bearing, Computer, Dynamics, Equipment, Fluid, Journal, Power, Program, Rotor, Spacecraft, Stability, Supply, Test.

For abstract, see STAR 05 02.
N67-11350 HC$3.00 MF$0.65

DEVELOPMENT AND BUILD OF PROTOTYPE TOOLS FOR INDUCTION BRAZING OF STAINLESS STEEL TUBING AND FITTINGS FOR NASA APPLICATIONS FINAL REPORT.
General Electric Co., Cincinnati, Ohio. Flight Propulsion Div.
D. H. Greisl. Mar 66, 106p NASA-CR-79752, R66FPD47
Contract NAS8-11554

Descriptors: *Brazing, *Fitting, *Tool, *Tubing, Coupling, Elbow, Fluid, Induction, Leakage, Manufacturing, Propulsion, Rocket, Sizing, Stainless, Steel.

For abstract, see STAR 05 02.
N67-11687 HC$3.00 MF$0.65

FILM-TRANSFER STUDIES OF SEVEN BALL-BEARING RETAINER MATERIALS IN 60 DEG R (33 DEG K) HYDROGEN GAS AT 0.8 MILLION DN VALUE.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
W. J. Anderson, D. E. Brewe, and H. W. Scibbe. Nov 66, 27p NASA-TN-D-3730
Contract 129-03-13-01-22

Descriptors: *Ball bearing, *Materials erosion, *Metal film, *Self-lubricating material, *Wear, Ball, Bearing, Composite, Disulfide, Environment, Erosion, Fiber, Film, Formation, Gas, Glass, History, Life, Material, Metal, Molybdenum, Polytetrafluoroethylene, Retainer, Selenide, Self-lubrication, Transfer

For abstract, see STAR 05 02.
N67-11813 HC$3.00 MF$0.65

HYDRODYNAMIC JOURNAL BEARING PROGRAM QUARTERLY PROGRESS REPORT, JAN. 29 - APR. 29, 1966.
General Electric Co., Cincinnati, Ohio. Space Power And Propulsion Section.
J. C. Amos, W. H. Bennethum, H. E. Nichols, W. D. Richards, and R. J. Rossbach. 29 Apr 66, 94p NASA-CR-72068, QPR-4
Contract NAS3-6479

Descriptors: *Alignment, *Journal bearing, *Spacecraft power supply, *Test program, Angular, Bearing, Fabrication, Hydrodynamics, Journal, Lubrication, Potassium, Power, Program, Rotor, Spacecraft, Supply, Test, Transverse, Water.

For abstract, see STAR 05 02.
N67-12095 HC$3.00 MF$0.65

EXPANSION OF A CUTTING TOOL DURING CHIP REMOVAL,
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 11F.
For abstract, see NSA 20 24.
UCRL-50116 HC$3.00 MF$0.65

13J. MARINE ENGINEERING

INVESTIGATION OF 1,4-CYCLOHEXANEBIS (METHYLAMINE) AS A REGENERATIVE CARBON DIOXIDE ABSORBENT.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 7C.
AD-643 555 HC$3.00 MF$0.65

NONPARAMETRIC RELIABILITY AND MAINTAINABILITY SPECIFICATION FOR MECHANICAL SYSTEMS.
Technical memo.,
Navy Marine Engineering Lab., Annapolis, Md.
J. I. Schwartz. Dec 66, 26p MEL-TM-457/66

Descriptors: (*Marine engineering, Naval equipment), (*Naval equipment, Specifications), Reliability, Maintainability, Machines, Design.

The report presents a method for estimating reliability and maintainability probabilities from operational tests. This method is distribution-free; that is, it is based on nonparametric statistics and will always yield a conservative estimate. Examples of usage are also presented. (Author)
AD-643 556 HC$3.00 MF$0.65

SUBMARINE CONTROL BY A SINGLE OPERATOR.
Technical rept.,
Dunlap and Associates, Inc., Stamford, Conn.
Charles R. Kelley, Jerome H. Ely, and Ralph C. Channell. 20 Oct 53, 132p
SPECDEVCEN-954-00-18
Contract Nonr-954 (00)

Descriptors: (*Submarines, Control panels), (*Control panels, Operators (Personnel)), Submarine personnel, Human engineering, Control systems, Design, Performance (Engineering), Instrumentation, Positioning reactions, Control knobs.

This report is an analysis of some of the problems involved in one-man submarine control. It is an attempt to study systematically the submarine control system, assuming there is a single human link between the sensing instruments measuring the submarine's performance and the control surfaces used to minimize errors in this performance.
AD-643 655 HC$3.00 MF$0.65

ILLUMINATION IN THE ATTACK CENTER AND PERISCOPE AREA OF THE SS 563/864.
Technical rept.,
Dunlap and Associates, Inc., Stamford, Conn.
Jesse Orlansky, Edward Girden, Grace S. Chan, and Ralph C. Channell. 22 Aug 49, 47p
SPECDEVCEN-641-2-2.
Contract N8onr-641 (02)
Report on Human Engineering System Studies.

Descriptors: (*Submarines, Illumination), (*Illumination, Specifications), Submarine periscopes, Lighting equipment, Submarine personnel, Adaptation (Physiology), Vision, Brightness, Performance (Human), Human engineering.

This report evaluates the room and instrument illumination required for efficient performance in the Attack Center and Periscope Area of the Class 563/564 submarine. Cognizant Navy personnel were interviewed to determine probable operational procedures in the Attack Center and Periscope Area. The implication of these procedures for illumination was considered. Then, provisional lighting specifications were developed for these areas. In doing so, attention was paid to the current Navy specifications and to the relevant literature.
AD-643 828 HC$3.00 MF$0.65

A THEORETICAL AND EXPERIMENTAL STUDY OF PROPELLER-SHAFT FAILURES,
David Taylor Model Basin, Washington, D. C.
Norman H. Jasper. Aug 53, 68p DTMB-808

Descriptors: (*Propellers (Marine), Failure (Mechanics)), (*Shafts, Failure (Mechanics)), Stresses, Tankers, Vibration, Design.

The report presents a detailed study of the stresses in the tailshaft of a T2-SE-A2 tanker of the MISSION type, including an analysis of the causes of tailshaft failures encountered in these ships as well as in Liberty ships and other ships of similar type. The study is based on full-scale tests as well as on theoretical analyses. Special emphasis is placed on the effects of a whirling type of flexural vibration on the stresses and motions of the shaft. Design methods are evaluated in the light of the above analysis. One of the principal conclusions is that the shaft failures are due to a lack of endurance strength of the shaft as designed and built and not due to a serious lack of endurance strength of the shafting material itself. This lack of endurance strength appears to be associated with the microscopic stress variations rather than with macroscopic stress variations. (Author)
AD-643 846 HC$3.00 MF$0.65

RESPONSE OF DRYDOCK GATES TO BLAST LOADING.
Final rept., 15 Feb-15 Oct 66,
MacNeal-Schwendler Corp., San Marino, Calif.
John J. Brooks. 25 Oct 66, 145p
NCEL-CR-67.011
Contract NBy-62196

Descriptors: (*Drydock equipment, Doors), (*Blast, Drydock equipment), Nuclear explosions, Loading (Mechanics), Stresses, Mathematical prediction, Nuclear explosion damage.

Relatively simple methods of predicting the response of the primary structure of drydock closures for damage assessment purposes were developed in this study. It was found that the lowest natural mode is the principal contributor to deflections and stresses as long as the dynamic loads are applied simultaneously to all parts of the gate. Static analyses were made for uniform and hydrostatic loads, and transient analyses were made for simple blast pulses and uniform step-function loads. Two modal analyses were also made. It was found that the static deflection shapes are very similar to the first natural mode shape, and can be used as such for the accuracy required for damage assessment. Only the virtual mass of the water, the concrete ballast, and the water ballast are important for determining the appropriate mass parameter for a drydock gate. It was found that the peak stresses due to a suddenly applied uniform pressure of the same magnitude as the hydrostatic pressure at the bottom of the gate are about 6 times higher than those due to the hydrostatic pressure for which the gate presumably has been designed. It is apparent that additional study is needed to define the nuclear environment for drydock gates, since it is not clear as to which phenomenon is the principal threat. (Author)
AD-643 853 HC$3.00 MF$0.65

EFFECTS OF NOTCHES AND SALTWATER CORROSION ON THE FLEXURAL FATIGUE PROPERTIES OF STEELS FOR HYDROSPACE VEHICLES.
Research and development rept.,
Navy Marine Engineering Lab., Annapolis, Md.
M. R. Gross, and E. J. Czyryca. Oct 66, 42p
MEL-420/66

Descriptors: (*Hydrofoils, Ship structural components), (*Marine engineering, Hydrofoils), Steel, Corrosion, Notch sensitivity, Fatigue (Mechanics), Stresses, Tensile properties, Chemical analysis, Rivers, Salinity, Sea water.

The flexural fatigue behavior of five constructional steels was investigated in air and salt water over a broad life spectrum ranging from 1000 to 100 million cycles. The yield strengths of the steels ranged from 40 to 200 thousand pounds per square inch (ksi). The effects of notches having theoretical stress concentrations ranging from 1.3 to 6 were included in this study. General conclusions are: (1) both mechanical notches and saltwater corrosion are more damaging in high-cycle fatigue; (2) the combined effect of mechanical notches and salt water is greater than either operating independently; and (3) the high-cycle saltwater corrosion-fatigue strengths of sharply notched low and intermediate alloy steels are less than 10 ksi beyond 10-million cycles, regardless of the tensile yield strength level. Additional conclusions relative to notch root radius, corrosion characteristics of the steels, and fatigue design curves are presented.
AD-644 147 HC$3.00 MF$0.65

13K. PUMPS, FILTERS, PIPES, FITTINGS, TUBING, AND VALVES

REFERENCE CATALOG ON PUMPS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
D. N. Azarkh, and N. V. Popova. 14 Jul 66, 72p
FTD-TT-65-1786
TT-67-60319
Unedited rough draft trans. of mono. Nasosy; Katalog-Spravochnik, n.p. 1960 p85-90, 142-5, 154-60, 197-203, 242-62.

Descriptors: (*Pumps, Catalogs), Centrifugal pumps, Feed pumps, Design, USSR.

Contents: Type NDsV centrifugal pumps; Centrifugal pump 8MB-9X2; Type P feed pumps; Immersible artesian pumps, type AP; Type FSD mixing pumps; Type NP sand pumps; Sand pump 6P-7.
AD-644 164 HC$3.00 MF$0.65

LIQUID HYDROGEN FLEXIBLE DUCTING TECHNOLOGY FINAL REPORT, JUN. 1964 - JAN. 1966.
Solar, San Diego, Calif.
H. T. Mischel. 30 Jun 66, 147p NASA-CR-79730, ER-1473-15
Contract NAS8-11303

Descriptors: *Aerospace technology, *Duct, *Liquid hydrogen, Aerospace, Application, Component, Flexible, Hydrogen, Insulation, Joint, Liquid, Space flight, System, Technology, Tube, Vehicle.

For abstract, see STAR 05 02.
N67-12280 HC$3.00 MF$0.65

13L. SAFETY ENGINEERING

SCATTERED RADIATION (SKYSHINE) CONTRIBUTION TO AN OPEN BASEMENT LOCATED IN A SIMULATED FALLOUT FIELD.
Final rept.,
Army Nuclear Defense Lab., Edgewood Arsenal, Md.
Michael J. Schumchyk, Murray A. Schmoke, Walter O. Egerland, and Ernest L. Schulman. Dec 66, 64p NDL-TR-68

Descriptors: (*Concrete, *Shielding), (*Fallout shelters, Shielding), Buildings, Radioactive fallout, Cobalt, Gamma rays, Simulation, Walls.
Identifiers: Skyshine.

The objective of the work was to determine, experimentally, the shielding afforded by an open concrete-walled basement located in a simulated fa

lout field and to compare these experimental results with theoretical results published in National Bureau of Standards (NBS) Monograph 42. A cobalt-60 point-source circulation system was used to simulate a uniformly-contaminated residual gamma radiation area out to a radius of 600 feet. Experimental exposure-rate measurements were made in the free field and at various locations within the structure as a function of height above the basement floor. Ionization chamber dosimeters were used as radiation detectors. Experimental measurements were extrapolated to infinite-field conditions by use of analytical procedures and compared with other related experimental data and theoretical results. (Author)
AD-643 538 HC$3.00 MF$0.65

DEVELOPMENT OF RAPID SHUTDOWN TECHNIQUES FOR CRITICAL INDUSTRIES,
Stanford Research Inst., Menlo Park, Calif.
For primary bibliographic entry see Field 13I.
AD-643 573 HC$3.00 MF$0.65

13M. STRUCTURAL ENGINEERING

STABILITY OF ELASTIC PLATES UNDER RANDOM MEMBRANE STRESS.
Technische Hochschule, Vienna (Austria). Institut fuer Mechanik (II).
For primary bibliographic entry see Field 20K.
AD-643 697 Not available from CFSTI.

METHODS OF INVESTIGATING THE STABILITY OF LONGITUDINALLY CORRUGATED CYLINDRICAL SHELLS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
H. L. Komisarova. 27 Jun 66, 7p FTD-TT-65-1947
TT-67-60254
Unedited rough draft trans. of Akademiya Nauk URSR, Kiev. Dopovidi n1 p33-6 1965.

Descriptors: (*Structural shells, Stiffened cylinders), Cylindrical bodies, Stability, Loading (Mechanics), Force (Mechanics).
Identifiers: Corrugated construction.

The stability of a longitudinally corrugated cylindrical shell, compressed by longitudinal forces uniformly distributed over its fronts was investigated. The theory of equilibrium of thin walled rods was applied for the purpose of dividing the shell into rods. It was shown that the reaction forces between the mentioned rods affect the value of the critical load.
AD-643 728 HC$3.00 MF$0.65

NATURAL OSCILLATIONS AND STABILITY OF CONTINUOUS TRIPLE-LAYER PLATES WITH LIGHT FILLER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yu. V. Krasnobaev. 5 Oct 66, 7p FTD-HT-66-285
Unedited rough draft trans. of Akademiya Nauk URSR, Kiev. Dopovidi n3 p314-7 1965.

Descriptors: (*Sandwich panels, Oscillation), USSR, Stability, Rectangular bodies, Mechanics, Equations of motion, Loading (Mechanics), Thickness, Filling.

The article considers natural oscillations and stability of continuous rectangular plates with a light filler with different thicknesses of the layers and a constant magnitude of 2n sub i + t sub i (i = 1, 2, 3, ..., n). An equation is obtained for the natural-vibration frequency and the critical load for continuous three-layer plates with their long edges supported and the short edges arbitrarily fixed. (Author)
AD-643 928 HC$3.00 MF$0.65

APPROXIMATE CALCULATIONS OF ELASTIC-PLASTIC THIN SHELL THEORY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Chou Tsen-ti. 8 Sep 66, 20p FTD-TT-65-1828
Edited trans. of Li Hsueh Hsueh Pao (Chinese People's Republic) v7 n1 11p 1964.

Descriptors: (*Structural shells, Numerical analysis), (*Deformation, Structural shells), Elasticity, Plasticity, Theory, Cylindrical bodies, Energy, Loading (Mechanics), Strain (Mechanics), China.

In this paper the energy method was employed to analyze the elastic-plastic deformation of thin sheels of linear hardening materials. The strain energy is calculated by using the method elastic energy together with a reduced plastic energy, and the problem becomes an elasticity problem together with an ideal plasticity problem. The problem of a circular cylindrical shell loaded symmetrically with respect to its axis was also calculated. Results are in agreement with those of A.A. Il'yushin. Utilizing this method, a considerably simpler calculation formula was obtained which describes the case of plastic deformation. Thus the calculation work is drastically reduced and the mechanical conception is also relatively easy to understand; hence, this method is easy to apply to other cases. (Author)
AD-643 970 HC$3.00 MF$0.65

FATIGUE OF REINFORCED CONCRETE DUE TO COMPLETE REVERSAL LOADING TECHNICAL MEMORANDUM NO. 65-2.
Wyle Labs., Inc., Huntsville, Ala.
G. Chan. 1966, 17p NASA-CR-79529
Contract NAS8-11217

Descriptors: *Concrete, *Dynamic load, *Reinforced material, Acoustic, Beam, Design, Dynamic, Fatigue, Field, High intensity, Load, Material, Reinforced, Reversal, Sound, Strength, Stress, Structural, Tensile, Test, Vibration.

For abstract, see STAR 05 02.
N67-11683 HC$3.00 MF$0.65

FATIGUE OF REINFORCED CONCRETE DUE TO SINUSOIDAL AND RANDOM LOADINGS.
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
G. C. Chan. Jul 66, 90p NASA-CR-79530, WR-66-40
Contract NAS8-5384

Descriptors: *Concrete, *Random load, *Reinforced material, Acoustic, Beam, Calculation, Dynamic, Fatigue, Launch, Load, Material, Measurement, Random, Reinforced, Sinusoid, Site, Stress, Vibration.

For abstract, see STAR 05 02.
N67-11684 HC$3.00 MF$0.65

14. METHODS AND EQUIPMENT

14A. COST EFFECTIVENESS

COST RELIABILITY FACTORS IN HYBRID CIRCUIT PACKAGING,
Rome Air Development Center, Griffiss AFB, N. Y.
For primary bibliographic entry see Field 9E.
AD-643 969 HC$3.00 MF$0.65

14B. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

THE DEVELOPMENT, DESIGN AND CONSTRUCTION OF A MAGNETIC SUSPENSION SYSTEM FOR THE R.A.E. 7 INCH x 7 INCH (18 x 18 cm) HYPERSONIC WIND TUNNEL.
Technical rept.,
Royal Aircraft Establishment, Farnborough (England).
A. Wilson, and B. Luff. Aug 66, 46p TR-66248

Descriptors: (*Wind tunnel models, *Suspension devices), (*Hypersonic wind tunnels, Suspension devices), Design, Hypersonic characteristics, Drag, Conical bodies, Great Britain.

A magnetic suspension system for aerodynamic wind tunnel models is described. The system is designed to hold axi-symmetrical models in a Mach 8 airstream. The models, which may be flown at small degrees of incidence, are controlled in five degrees of freedom. Aerodynamic forces on a model may be measured under conditions more nearly approaching those of free flight. The system has been used to measure drag forces on a conical model. No great difficulties were encountered in launching or recovering the model. (Author)
AD-643 559 HC$3.00 MF$0.65

AN ELECTRO-MECHANICAL FLIP-FLOP WITH APPLICATIONS TO COUNTING, TIMING AND RANDOMIZATION,
Army Medical Research Lab., Fort Knox, Ky. Biophysics Div.
For primary bibliographic entry see Field 9E.
AD-643 607 Not available from CFSTI.

THE RAPID ACTING MICROWAVE INTERFEROMETER WITH DIRECT PHASE READING,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. G. Grigorenko, and L. A. Dushin. 7 Dec 66, 14p FTD-HT-66-272
TT-67-60194
Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v9 n11 p1185-91 1964.

Descriptors: (*Radio interferometers, Microwave equipment), (*Plasma physics, Radio interferometers), USSR, Measurement, Microwaves, Phase detectors, Phase modulation, Phase shift, Design, Plasma medium.

A wide use of microwave methods has recently been found for plasma diagnostics, whose advantage is that during their application to the plasma, disturbances do not occur because the devices' antennas, which send sounding signals, may be situated beyond the vacuum volume occupied by the plasma. The largest suitable device for such measurements are microwave interferometers, which allow the observation of terminal changes in electron concentration in the plasma and partial collision with time when measuring the extinction of signals. In addition, interferometers allow measurements of pulse processes to be carried out, which are characteristic for modern experimental installations for plasma investigation. In this paper a comparison of different interferometer diagrams is given, and an interferometer with an electronic computer is described. (Author)
AD-643 622 HC$3.00 MF$0.65

A DEVICE FOR BREAKING THE DIAPHRAGM OF A GAS-DYNAMICAL SHOCK TUBE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. D. Mikhalevskii, and G. P. Startsev. 2 Sep 66, 5p FTD-HT-66-85
Unedited rough draft trans. of Patent (USSR) 165 920, appl. 857348/26-10, 16 Sep 63.

Descriptors: (*Shock tubes, *Diaphragms (Mechanics)), Dynamics, Patents, USSR.

The object of the invention is a device for breaking the diaphragm of a gas-dynamical shock tube, which is the mechanism of destruction of the diaphragm, is different in that, to simplify the design and obtain high reproducibility of the rupture pressure of unpolished diaphragms, the mechanism of destruction is made in the form of knives placed directly behind the diaphragm in the transverse cross section of the tube perpendicular to one another and forming a wedge-shaped edge at their point of intersection. (Author)
AD-643 698 HC$3.00 MF$0.65

AN INSTRUMENT FOR MEASURING THE THICKNESS OF THIN NONMAGNETIC AND NONMETALLIC COVERINGS ON A FERROMAGNETIC BASE.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. V. Svistunov, and N. L. Bondarenko. 9 Sep 66, 6p FTD-HT-66-96
Unedited rough draft trans. of Patent (USSR) 170 695, appl. 863115/26-10, 26 Oct 63.

Descriptors: (*Meters, Thickness), (*Coatings, Measurement), Patents, USSR, Instrumentation, Ferromagnetic materials.

The object of the invention is an instrument for measuring the thickness of thin nonmagnetic and nonmetallic coverings on a ferromagnetic base, which contains a generator, measuring and compensating bridges, a resonance amplifier, a resonance cascade, two detectors, a summing block and a measuring instrument. To exclude the effect of a change in the magnetic permeability of the base upon the accuracy of the measurements, the measuring bridge with inductive transducers and balancing elements is connected to the inputs of a two-channel resonance amplifier whose first channel is tuned to the third harmonic of the generator frequency and the second channel is tuned to the basic frequency of the generator. (Author)
AD-643 700 HC$3.00 MF$0.65

SPIN OSCILLATOR.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
R. M. Umarkhodzhaev. 16 Sep 66, 7p FTD-TT-65-1899
TT-67-60257
Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 3: Fizika, Astronomiya (USSR) v19 n5 p88-9 1964.

Descriptors: (*Microwave spectroscopy, Oscillators), (*Oscillators, *Nuclear spins), Magnetic fields, Nuclear magnetic resonance, Instrumentation, Design, Stability, Precession, USSR.

Consideration is given to the necessary parameters of a highly stable retunable spin oscillator. The device described generates a voltage with a frequency equal to the lamor precession frequency, operates without a compensation circuit, and has an instability value of less than 0.0000001.
AD-643 720 HC$3.00 MF$0.65

AUTOMATION, VOL. 3, NO. 3, 1960: SELECTED ARTICLES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 13H.
AD-643 731 HC$3.00 MF$0.65

PIEZORESISTIVE STRAIN GAGE ACCELEROMETERS.
Technical rept.,
Picatinny Arsenal, Dover, N. J. Engineering Sciences Lab.
E. J. Evans. Dec 66, 78p
PA-TR-3374

Descriptors: (*Accelerometers, Strain gages), (*Strain gages, Semiconductor devices), (*Piezoelectric transducers, Microminiaturization (Electronics)), Piezoelectric effect, Silicon, Springs, Integrated circuits, Military requirements, Resistance (Electrical), Thermistors, Boron.

Semiconductor strain gages have been successfully integrated by diffusion into silicon spring members, resulting in microelectronic transducers. This concept of using force b1 be input parameter to an integrated circuit has been shown to be feasible for many military applications including accelerometers, pressure transducers, and vibration pickups. The principal topics covered in this report are (1) characterization of integrated semiconductor strain gage materials, (2) theory of integrated transducer design for a military environment, (3) integrated circuit force sensor fabrication techniques, and (4) design, fabrication, and evaluation of a typical accelerometer. (Author)
AD-643 751 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AIR BEARING ROCKET SLED SLIPPERS.
Final rept. 16 Feb-1 Jul 66,
Kaman Aircraft Corp., Bloomfield, Conn.
R. C. Meier, and A. F. Smith. Jul 66, 123p R-638 MDC-TR-66-110
Contract AF 29(600)-5516

Descriptors: (*Rocket-propelled sleds, *Gas bearings), Feasibility studies, Lubrication, Erosion, Corrosion inhibition, Coatings.

A study was conducted to investigate the feasibility of applying the principle of air film lubrication to rocket sled slippers to: (1) overcome erosive oxidation and severe melting effects experienced at hypersonic speeds and (2) alleviate rail-induced vibrations. Results of the study indicate that a simple self-acting type of bearing can support a typical monorail rocket sled, without contact between the slipper and the rail, at speeds between Mach 1.5 and Mach 6. With contact eliminated, the slipper can be coated with a refractory material to prevent erosive oxidation and melting of slipper structural material. This type of air bearing slipper appears to be the most suitable for AFMDC requirements. An externally pressurized type of slipper bearing is capable of preventing slipper-rail contact over the entire speed range of typical monorail and dual rail sleds. However, the weight and volume of the associated pressurization system are large, and are considered prohibitive for a practical design. The most critical track requirements for an application of air lubricated slippers are the vertical alignment and dimensional tolerances of the rail. (Author)
AD-643 756 HC$3.00 MF$0.65

THE ELECTROMAGNETIC PROPAGATION RANGE FACILITY AT THE BALLISTIC RESEARCH LABORATORIES.
Ballistic Research Labs., Aberdeen Proving Ground, Md.
Channing L. Adams. Jul 66, 86p BRL-R-1331

Descriptors: (*Ranges (Establishments), Propagation), Electromagnetic waves, Meteorological instruments, Digital recording systems, Meteorological parameters.

The report describes the instrumented range facility designated the Electromagnetic Propagation Range as established by the Ballistic Research Laboratories (BRL) in support of fundamental research in the near-earth meteorological environment. It includes a description of the multi-channel, high-speed, digital data acquisition system, the types of instrumentation used for obtaining meteorological data, methods of instrument and sensor calibration, and typical results of field programs. Tabulated data and photographs of all parts of the system are included. (Author)
AD-643 770 HC$3.00 MF$0.65

MACHINE COMPUTATION OF NUCLEAR MAGNETIC RESONANCE SPECTRA.
Final rept., 1 Jan 10 May 66,
Air Force Materials Lab., Wright-Patterson AFB, Ohio.
H. A. Rush. Aug 66, 43p AFML-TR-66-196

Descriptors: (*Nuclear magnetic resonance, *Computer programs), Spectroscopy, Numerical analysis, Line spectrum, Nuclear spins, Display systems.

A modified computer program (NMRP) is described for the computation of theoretical nuclear magnetic resonance spectra with up to seven nuclei of spin one-half. This program provides a reduced set of spectral lines and a printer display plot of the spectrum in addition to output provided by the program from which it was derived. (Author)
AD-643 775 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE, TRANSISTOR TYPE POTENTIOMETERS.
Final engineering rept. 1 Jul 61-30 Sep 66,
CTS Corp., Elkhart, Ind. Research and Development Div.
Daniel C. Kinsey, and Robert J. Masten. 30 Sep 66, 171p
Contract DA-36-039-sc-85976
See also AD-638-970.

Descriptors: (*Potentiometers, Manufacturing methods), (*Subminiature electronic equipment, Potentiometers), Transistors, Reliability (Electronics), Quality control.

This contract established producibility of a 3/8 in. diameter miniature, TO-5 transistor size, general purpose variable resistor. This size control was designed, utilizing principles already proven in on the 1/2 in. diameter, cermet element, variable resistor which was being produced (series 600) at the time the contract was let. The miniature nature of the product led to some difficulties in meeting all the original specification requirements. The problems were solved by corrections of faulty test procedures, by closer control of production processes and some modifications to the original requirements, to make them realistic in terms of a general purpose type variable resistor. Preproduction samples met the final qualification requirements, the pilot run was completed and shipped and the general report for Step II was accepted by the government. (Author)
AD-643 778 HC$3.00 MF$0.65

THE USE OF SELF-CALIBRATING CATALYTIC PROBES TO MEASURE FREE-STREAM ATOM CONCENTRATION IN A HYPERSONIC FLOW.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
For primary bibliographic entry see Field 20D.
AD-643 822 HC$3.00 MF$0.65

A SINGLE-IMPULSE SYSTEM FOR GENERATING SOLITARY, UNDULATING SURGE, AND GRAVITY SHOCK WAVES IN THE LABORATORY.
Technical rept.,
Chicago Univ., Ill. Fluid Dynamics and Sediment Transport Lab.
Robert L. Miller, and Robert V. White. Jun 66, 50p TR-5
Contract Nonr-2121 (26)

Descriptors: (*Shock waves, *Pulse generators), (*Water waves, Simulators), Mechanical waves, Design, Hydrodynamics, Pistons, Calibration.

A piston type system was devised to create single-impulse wave for laboratory study. These include

solitary waves, undulating surge and gravity shock waves. y sub 2/y sub 1 values as high as 4.0 were obtained, which for a still water depth (y sub 1) of 0.4' would result in a y sub 2/y sub 1 ratio of 1.6'. Details of design and construction are given. Calibration and comparison of observed vs. expected wave properties are discussed. Included are application of strobe flash and high speed motion picture techniques. (Author)
AD-643 823 HC$3.00 MF$0.65

CERTAIN PERSPECTIVES FOR THE USE OF THE PULSE METHOD OF DETERMINING THE ELASTIC CONSTANTS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. M. Mukhin. 27 Sep 66, 8p FTD-HT-66-406
TT-67-60240
Unedited rough draft trans. of Primenenie Ultraakustiki k Issledovaniyu Veshchestva (USSR) n18 p249-52 1963.

Descriptors: (*Elasticity, *Test methods), Pulse systems, Temperature, Radiation damage, Determination, Piezoelectric transducers, Solids, USSR, Copper, Graphite.

The application of the pulse method of determining the elastic constants to conditions when the investigated sample is in the active zone of the apparatus makes it possible to observe the kinetics of the effect of radiation on different material. The pulse method has significant advantages over resonance methods that use standing waves in samples: (1) The possibility of accurate temperature control on the working part of the sample through thermocouples. (2) Simultaneous determination of all the elastic constants on the same sample. (3) The possibility of removing the transducers from the active zone of the apparatus. The accuracy of this method can be very high, since it basically depends upon the accuracy of determining velocity. An experiment was conducted on graphite and copper samples. During the experiment certain changes were observed in the elastic properties of samples under the effect of radiation. Thus, the possibility of investigating the kinetics of the effect of irradiation on the elastic properties of materials with the aid of the pulse method was shown.
AD-643 902 HC$3.00 MF$0.65

MINIATURE SEMICONDUCTOR PRESSURE SENSOR.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. A. Osipovich, and I. I. Smyslov. 29 Aug 66, 7p FTD-HT-66-314
TT-67-60246
Unedited rough draft trans. of Priborostroenie (USSR), n10 p24-5 1965.

Descriptors: (*Pressure gages, *Semiconductors), Sensors, Dendritic structure, Germanium, Foils, USSR, Miniature electrical equipment.

It is concluded that the application of strain-gauge elements made from dendritic germanium foil for miniature pressure sensors is very promising because these strain-gauge elements can be made minimally small, for example, 1.5 - 2 mm long, 0.2 - 0.3 mm wide and 0.15 - 0.2 mm thick, and even smaller. (Author)
AD-643 931 HC$3.00 MF$0.65

HIGH TEMPERATURE, LOW DENSITY BOUNDARY-LAYER CONTROL BY CRYOGENIC PUMPING.
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
For primary bibliographic entry see Field 20D.
AD-643 963 HC$3.00 MF$0.65

IMPROVEMENT OF A METHOD OF RADIOWAVE SOUNDING GAS, HEATED BY A SHOCK WAVE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yu. S. Lobastov. 7 Oct 66, 12p FTD-TT-66-8
TT-67-60284
Unedited rough draft trans. of Unidentified mono., n.p. 1964 p22-8 (pub. by Akademiya Nauk SSSR. Energeticheskii Institut).

Descriptors: (*Gases, High-temperature research), (*Radio waves, Test methods), Waveguides, Plasma medium, Gas ionization, Shock tubes, USSR.

Several radio methods presently exist for studying the parameters of high temperature gas. An examination is made of their applicability when working in a shock tube.
AD-644 016 HC$3.00 MF$0.65

PRINCIPLE OF THE DYNAMIC X-RAY DIFFRACTION TECHNIQUE.
Technical rept.,
Massachusetts Univ., Amherst. Polymer Research Inst.
Tatsuro Kawaguchi. Apr 66, 38p TR-1
ONR-TR-86
Contract Nonr-3357 (01)

Descriptors: (*X-ray diffraction analysis, Mathematical analysis), Crystal structure, Diffraction, Intensity, Dynamics.

A mathematical analysis is made of data obtained by the dynamic x-ray diffraction technique. It is shown how by measuring the integrated diffraction intensity over a given interval of the strain cycle and accumulating results over many cycles of strain, the portion of the change in diffracted intensity which is in phase (delta I') and out of phase (delta I") with the applied sinusoidal strain may be obtained. The means for separating contributions of overlapping crystalline and amorphous peaks is discussed as is the determination of the dynamic orientation function by graphical integration of the change in diffracted intensity with azimuthal angle. (Author)
AD-644 029 HC$3.00 MF$0.65

PIEZOELECTRIC TRANSDUCER OF ACCELERATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
P. M. Alabuzhev, P. I. Ostromenskii, and V. F. Khon. 9 Sep 66, 6p FTD-HT-66-106
Unedited rough draft trans. of Patent (USSR) 171 676, appl. 894836/25/28, 9 Apr 64.

Descriptors: (*Accelerometers, Piezoelectric transducers), Patents, USSR, Piezoelectric crystals, Spheres, Stabilized platforms, Design, Filling, Fluids, Electrical conductance.

The object of the invention is a piezoelectric transducer of acceleration, which contains a piezoelectric element rigidly fastened to a body, an inertial mass and a recording apparatus. To simplify the design the piezoelectric element is made in the form of a spherical shell from a piezoceramic with a metallic external surface and this shell is filled with an electrical conducting fluid, which is simultaneously the inertial mass and the internal electrode of the piezoelectric element. (Author)
AD-644 041 HC$3.00 MF$0.65

PULSE FREQUENCY DETECTOR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. Benes. 12 Sep 66, 22p FTD-HT-66-156
Unedited rough draft trans. of Slaboproudy Obzor (Czechoslovakia) v25 n9 p528-32 1964.

Descriptors: (*Pulse analyzers, Frequency analyzers), Czechoslovakia, Design, Voltage.

An explaination is given of the derivation of a new method for the obtainment of differential frequency of a pulse process from two input signals also of pulse process. Described is a pulse frequency detector with tunnel diodes and its properties are described in greater detail. The detector works with the summation of the signal giving at input a diphase voltage or differentiation frequency and the double value signal, carrying information about the positive or negative differentiation frequency value. (Author)
AD-644 045 HC$3.00 MF$0.65

STUDY OF NON-DESTRUCTIVE MEASURING OF CASE DEPTH AND CASE HARDNESS.
Final rept. on phase 1,
Sperry Products, Inc., Danbury, Conn.
H. A. Elion. 21 Jan 55, 72p C-1827G
Contract DA-20-089-ORD-37092
See also AD-643 199.

Descriptors: (*Case hardening, Non-destructive testing), (*Non-destructive testing, Ultrasonic radiation), Steel, Hardness, Thickness, Chromium alloys, Molybdenum alloys, Instrumentation, Measurement.

Results indicate that the Reflectoscope structure scattering technique might be applied successfully to direct case depth measurements of chromium-molybdenum steels within the range of a few thousandths to several inches of case depth. Case hardness might be measured using a Reflectoscope surface mode velocity technique within limits of area investigated. In addition the bracketing of ultrasonic data obtained during the investigations indicated that several techniques for ultrasonic determinations of hardness and case depth are possible. These techniques are also reported. Investigations of ultrasonics, hardness, and structure in chromium-molybdenum steels have enabled ultrasonic behavior relationships not previously reported to be given. The Reflectoscope technique described is a general structure transition determination method, and as such should also be applicable to structure change determinations other than case depth, such as intergrain penetration.
AD-66 027 HC$3.00

STUDIES RELATED TO THE DESIGN OF A MAGNETIC SUSPENSION AND BALANCE SYSTEM INTERIM TECHNICAL REPORT, DEC. 1964 - JAN. 1966.
Massachusetts Inst. Of Tech., Cambridge. Aerophysics Lab.
V. V. Basmajian, A. B. Copeland, and T. Stephens. Feb 66, 231p NASA-CR-66233, ITR-128
Contract NAS1-4421

Descriptors: *Balance, *Hypersonic flow, *Magnetic suspension, Apparatus, Coil, Coordinate, Ferromagnetism, Flow, Force, Hypersonic, Magnetic, Moment, Power, Rolling, Suspension, System, Transformation.

For abstract, see STAR 05 02.
N67-11322 HC$3.00 MF$0.65

SECONDARY IRREGULARITIES IN THE EQUATORIAL ELECTROJET.
National Bureau Of Standards, Boulder, Colo. Inst. For Telecommunication Sciences And Aeronomy.
K. L. Bowles, and R. Cohen. 1966, 28p NASA-CR-79914
NASA ORDER R-83
Submitted For Publication

Descriptors: *Autocorrelation, *Equatorial electrojet, *Instrumentation, Analysis, Asymmetry, Characteristics, Experiment, Irregularity, Primary, Secondary, Spectral, Technique, Theory.

For abstract, see STAR 05 02.
N67-11846 HC$3.00 MF$0.65

Group 14B—Laboratories, test facilities, and test equipment

CONTINUITY GAGE MEASUREMENT OF CRACK GROWTH ON FLAT AND CURVED SURFACES AT CRYOGENIC TEMPERATURES.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
T. W. Orange, and T. L. Sullivan. Dec 66, 23p
NASA-TN-D-3747
Contract 124-08-08-19-22
Presented At The Isa 3rd Ann. Phys. And Mech. Meas. Instrumentation Symp., New York, 24-27 Oct. 1966

Descriptors: *Crack propagation, *Cryogenic temperature, *Surface crack, Alloy, Aluminum, Crack, Cryogenic, Curve, Flat, Foil, Fracture, Gauge, Measurement, Propagation, Steel, Strain, Surface, Temperature, Test, Titanium.

For abstract, see STAR 05 02.
N67-11959 HC$3.00 MF$0.65

APOLLO WIND TUNNEL TESTING PROGRAM - HISTORICAL DEVELOPMENT OF GENERAL CONFIGURATIONS.
National Aeronautics And Space Administration. Manned Spacecraft Center, Houston, Tex.
J. C. Martino, and W. C. Moseley, Jr., Dec 66, 75p
NASA-TN-D-3748
Contract 914-50-10-03-72
refs

Descriptors: *Apollo project, *Spacecraft design, *Test program, *Wind tunnel model, Aerodynamics, Angle, Attack, Configuration, Design, Development, Model, Pressure, Program, Project, Spacecraft, Temperature, Test, Tunnel, Wind.

For abstract, see STAR 05 02.
N67-11960 HC$3.00 MF$0.65

POTASSIUM CORROSION TEST LOOP DEVELOPMENT QUARTERLY PROGRESS REPORT, PERIOD ENDING APR. 15, 1966.
General Electric Co., Cincinnati, Ohio. Space Power And Propulsion Section.
E. E. Hoffman. 22 Jul 66, 76p NASA-CR-72042, QPR-11
Contract NAS3-2547

Descriptors: *Corrosion test, *Potassium, *Refractory alloy, *Test equipment, Alloy, Boiling, Component, Condensation, Contamination, Corrosion, Environment, Equipment, Loop, Operation, Refractory, Simulation, Sodium, Space, Test, Vacuum.

For abstract, see STAR 05 02.
N67-12093 HC$3.00 MF$0.65

PRECAUTIONS IN USING THERMOBALANCES.
Precautions A Prendre Dans L'emploi Des Thermobalances
National Aeronautics And Space Administration. Washington, D. C.
C. Duval. Sep 66, 26p NASA-TT-F-10281
Transl. Into English From Anal. Chim. Acta (France), V. 31, No. 4, 1964 P 301-314

Descriptors: *Gravimetry, *Pyrolysis, *Solid state, *Thermobalance, Analysis, Difference, Inorganic, Measurement, Organic, Reaction, Solid, Standard, State, Temperature, Volumetric.

For abstract, see STAR 05 02.
N67-12099 HC$3.00 MF$0.65

NULL GRAVITY SIMULATOR FINAL REPORT.
West Virginia Univ., Morgantown.
E. F. Byars, R. W. Shreeves, and H.-F. Yuan. 1966, 11p NASA-CR-79515
Grant NSG-533

Descriptors: *Space simulator, *Weightlessness, Bar, Coplanar, Equation, Force, Mass, Motion, Point, Simulator, Space, Surface, Theory, Two.

For abstract, see STAR 05 02.
N67-12218 HC$3.00 MF$0.65

14C. RECORDING DEVICES

HELICAL PACK TAPE RECORDER TRANSPORT FINAL REPORT.
Kinelogic Corp., Pasadena, Calif.
G. S. Barr. 25 Aug 66, 23p NASA-CR-80140
Contracts NAS7-100, JPL-951348
Prepared For Jpl

Descriptors: *Helical winding, *Magnetic tape, *Tape recorder, *Transport, Configuration, Construction, Design, Helical, Magnetic, Model, Pack, Recorder, Storage, Tape, Winding.

For abstract, see STAR 05 02.
N67-12162 HC$3.00 MF$0.65

14D. RELIABILITY

NONPARAMETRIC RELIABILITY AND MAINTAINABILITY SPECIFICATION FOR MECHANICAL SYSTEMS.
Navy Marine Engineering Lab., Annapolis, Md.
For primary bibliographic entry see Field 13J.
AD-643 556 HC$3.00 MF$0.65

RELIABILITY COMPUTATIONS FOR SYSTEMS WITH DEPENDENT FAILURES,
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Electrical Engineering.
Martin L. Shooman. 27 Jan 66, 10p
AFOSR-66-2364
Contract AF 49 (638)-1402
Availability: Published in Proceedings of the Annual Symposium on Reliability (1966), San Francisco, Calif., 25-27 Jan 1966, p712-18 1966.

Descriptors: (*Reliability, Mathematical models), Probability, Systems engineering, Failure (Electronics), Matrix algebra, Transistors.

Reliability theory has been concerned to a great extent with the formulation of mathematical models to describe rather complex reliability configurations. In most cases components in the system are assumed to fail independently so that a simple model can be postulated. Experience and good engineering judgement suggest that there are many physical situations in which the independence assumption leads to poor answers and conceals important details concerning the reasons for failure. This paper describes a technique for the formulation of system models which include dependence between components. The results are illustrated with two practical examples. (Author)
AD-643 569 Not available from CFSTI.

BAYESIAN ANALYSIS OF THE WEIBULL PROCESS WITH UNKNOWN SCALE PARAMETER.
Research Analysis Corp., McLean, Va.
For primary bibliographic entry see Field 12A.
AD-643 816 HC$3.00 MF$0.65

RELIABILITY OF ANALYSIS OF CIRCUIT ELEMENTS BY THE REDUNDANCY METHOD,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 9E.
AD-643 922 HC$3.00 MF$0.65

A MULTIVARIATE NOTION OF ASSOCIATION, WITH A RELIABILITY APPLICATION,
Boeing Scientific Research Labs., Seattle, Wash. Mathematical Research Lab.
For primary bibliographic entry see Field 12A.
AD-644 094 HC$3.00 MF$0.65

A GENERALIZED BIVARIATE EXPONENTIAL DISTRIBUTION,
Boeing Scientific Research Labs., Seattle, Wash. Mathematical Research Lab.
For primary bibliographic entry see Field 12A.
AD-644 120 HC$3.00 MF$0.65

14E. REPROGRAPHY

STEREOSCOPIC VIEWER FOR MEASURING POSITIONS AND ANGLES IN THREE DIMENSIONS,
California Inst. of Tech., Pasadena.
E. W. Cowan. 4 Apr 66, 3p
Contract Nonr-220 (53)
Availability: Published in Review of Scientific Instruments v37 n8 p1004-6 Aug 1966.

Descriptors: (*Stereoscopic display systems, Measurement), Photographic images, Photointerpretation, Stereoscopic photography, Photographs.

An optical device is described that is used for the measurement of the positions and angular coordinates of lines viewed in stereoscopic photographs, such as the photographs of particle tracks in a cloud chamber or bubble chamber. In addition to the absolute angular coordinates of a line in three dimensional space, the viewer furnishes the relative angular coordinates of a second intersecting line and the three rectangular coordinates of the point of intersection. All coordinates are read directly on linear scales. Applications include the measurement of scattering angles, the angles of secondary particles in an interaction or decay with respect to each other and the primary particle, and the angle of traversal of a particle through an absorber. (Author)
AD-643 463 Not available from CFSTI.

ROCKET PAYLOADS.
GCA Corp., Bedford, Mass. GCA Technology Div.
For primary bibliographic entry see Field 16C.
AD-643 541 HC$3.00 MF$0.65

DEVELOPMENT OF A VARISCALE STEREO POINT MARKING INSTRUMENT.
Bausch and Lomb, Inc., Rochester, N. Y.
For primary bibliographic entry see Field 8B.
AD-643 722 HC$3.00 MF$0.65

A FOUR SECOND MONOBATH,
Army Electronics Command, Fort Monmouth, N. J.
Christopher Lucas. 10 Jun 66, 4p
Presented at the Annual Conference, San Francisco, Calif., May 12, 1966.
Availability: Published in Photographic Science and Engineering v10 n5 p259-62 Oct-Sep 1966.

Descriptors: (*Photographic chemicals, Effectiveness), Photographic film, Processing, Airborne, Time.

A monobath was successfully compounded to process Eastman Kodak Plus X Reversal Film, SO-273, at 120F in four seconds, using continuous rapid agitation. The formulation procedure, monobath tests, sensitometric analysis, oxidation data, and rinse solution tests are described and discussed. (Author)
AD-643 801 Not available from CFSTI.

CERTAIN QUESTIONS OF THE INCREASING INTERPRETATION PROPERTIES OF AERIAL PHOTOGRAPHS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. I. Narkevich. 31 Aug 66, 27p FTD-MT-65-242
TT-67-60236
Edited machine trans. of mono. Kompleksonoe Deshifrirovanie Aerosnimkov, Moscow, p12-23 1964.

Descriptors: (*Aerial photographs, *Photointerpretability), Photographic images, Photographic contrast, Aerial reconnaissance, Photosensitivity, Oscillation, Vibration, Aerial cameras, State-of-the-art reviews, Aerial photography, Photogrammetry, USSR.

Contents: Features of construction of the photographic image in aerial photography; Image shifts caused by the forward motion and angular oscillations of the aircraft; Image shifts caused by vibrations of the aircraft and operation of mechanisms of the aerial camera; Effect of the positive process; Criteria for appraisals and control; State of the art and prospects; Informational properties of aerial photographs.
AD-643 896 HC$3.00 MF$0.65

PROBLEMS OF INFORMATION TRANSMISSION. INSTITUTE OF INFORMATION TRANSMISSION (SELECTED ARTICLES).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 9B.
AD-643 977 HC$3.00 MF$0.65

OPTICS OF PHOTOGRAPHIC AND AEROPHOTOGRAMMETRIC INSTRUMENTS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. S. Urmakher. 29 Jul 66, 32p FTD-HT-66-334
TT-67-60305
Unedited rough draft trans. of mono. Optika Fotograficheskikh i Aerofotogrammetricheskikh Priborov, Moscow 1965 p170-95.

Descriptors: (*Camera lenses, USSR), Photographic equipment, Cameras, Aerial photography, Optical equipment components, Camera components + accessories, Photomicrography.

Contents: Objectives for ground photography; Objectives for aerial photography; Objectives for reproduction; Optical systems of instruments for photomacrography and photomicrography.
AD-644 065 HC$3.00 MF$0.65

RANGER VII PHOTOGRAPHIC PARAMETERS.
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
W. E. Kirhofer, and D. E. Willingham. 1 Nov 66, 314p NASA-CR-79938, JPL-TR-32-964
Contract NAS7-100

Descriptors: *Photograph interpretation, *Ranger vii lunar probe, *Table, *Television camera, Altitude, Camera, Computer, Factor, Generation, Impact, Interpretation, Latitude, Longitude, Lunar, Parameter, Photograph, Probe, Program, Television, Time, Trajectory.

For abstract, see STAR 05 02.
N67-11817 HC$3.00 MF$0.65

RANGER VIII PHOTOGRAPHIC PARAMETERS.
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
W. E. Kirhofer, and D. E. Willingham. 1 Nov 66, 114p NASA-CR-79938, JPL-TR-32-965
Contract NAS7-100

Descriptors: *Photograph interpretation, *Ranger viii lunar probe, *Table, *Television camera, Camera, Computer, Factor, Generation, Impact, Interpretation, Latitude, Longitude, Lunar, Parameter, Photograph, Probe, Program, Television, Time, Trajectory.

For abstract, see STAR 05 02.
N67-11818 HC$3.00 MF$0.65

PHOTOVISCOUS TECHNIQUE DEVELOPMENT. VOLUME I - THEORY AND EXPERIMENTS.
Bendix Corp., Southfield, Mich. Research Labs. Div.
F. M. Faubert. 15 Jun 66, 87p NASA-CR-79519, REPT.-3477, VOL. I
Contract NAS8-5407

Descriptors: *Flow visualization, *Optical equipment, *Photoviscoelasticity, *Viscous fluid, Analysis, Birefringence, Dimension, Distribution, Dye, Equipment, Flow, Fluid, Liquid, Model, Optical, Strain, Test, Theory, Two, Velocity, Viscosity, Visualization.

For abstract, see STAR 05 02.
N67-12210 HC$3.00 MF$0.65

PHOTOVISCOUS TECHNIQUE DEVELOPMENT. VOLUME II - PHOTOVISCOUS TEST STAND.
Bendix Corp., Southfield, Mich. Research Labs. Div.
F. M. Faubert. 15 Jun 66, 26p NASA-CR-79520, REPT.-3477, VOL. II
Contract NAS8-5407

Descriptors: *Flow visualization, *Optical equipment, *Test stand, *Viscous fluid, Development, Dimension, Equipment, Flow, Fluid, Kinematics, Laminar, Maintenance, Measuring, Model, Operation, Optical, Photoviscoelasticity, Stand, Test, Two, Viscous, Visualization.

For abstract, see STAR 05 02.
N67-12211 HC$3.00 MF$0.65

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15. MILITARY SCIENCES

15B. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

CBR TRAINING AID REQUIREMENTS, ARMY WIDE.
Technical rept.,
George Peabody Coll. for Teachers, Nashville, Tenn.
W. D. McClurkin, Harold Benjamin, Harold Drummond, Harry Harap, and Lawrence Stewart. Jan 55, 209p
SPECDEVCEN-1257-1-1
Contract Nonr-1257 (01)

Descriptors: (*Army training, Military personnel), Chemical warfare, Biological warfare, Radiological warfare, Training devices, Instructors, Effectiveness, Chemical warfare agents, Psychometrics, Learning.

The study consists of the following: Basic Individual CBR Training; Advanced Individual CBR Training; Chemical Corps Unit CBR Training; Courses in the Chemical Corps School; Preparation for Overseas Replacement Training; CBR Training Aid Problems; CBR Problems of General Interest.
AD-643 654 HC$3.00 MF$0.65

15C. DEFENSE

THE REAR AND SUPPLY OF THE SOVIET ARMED FORCES, NO. 4.
Department of the Army, Washington, D. C.
14 Nov 66, 102p J-0086
TT-67-60217
Trans. of Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil (USSR) n4 p3-49, 54-73, 75-86, 95-6 1966.

Descriptors: (*Armed forces (Foreign), USSR), (*Logistics, Armed forces (Foreign)), Naval vessels (Combatant), Military personnel, Military training, Food, Military medicine, Armed forces supplies, Armed forces transportation, Economics.

Included in this translation are articles on combat training and troop indoctrination, supply and living condition of the troops, routes of communications and transport facilities, and logistical techniques and technical support.
AD-643 647 HC$3.00 MF$0.65

REAR AND SUPPLY OF THE SOVIET ARMED FORCES, NO. 7.
Department of the Army, Washington, D. C.
S. Gorshkov, V. Zotov, M. Milovskii, A. Tarslov, and F. Malykhin. 6 Oct 66, 108p J-0725
TT-67-60216
Trans. of Tyl i Snabzhenie Sovetskikh Vooruzhennykh Sil (USSR) n7 p1-96 1966.

Descriptors: (*Armed forces (Foreign), USSR), (*Fleets, Armed forces (Foreign)), Armed forces supplies, Armed forces transportation, Naval personnel, Naval training, Naval procurement, Food, Economics, Naval vessels (Combatant).

Included in this translation are articles on military training and education, military supply and life, means of communication and transportation, and rear technique and technical supply.
AD-643 648 HC$3.00 MF$0.65

CIVIL DEFENSE AND SOCIETY.
Interim rept.,
Pittsburgh Univ., Pa. Dept. of Sociology.
Jiri Nehnevajsa. 23 Jun 63, 263p
Contract OCD-OS-62-267

Descriptors: (*Civil defense systems, Effectiveness, (*Sociology, Civil defense systems), Probability, Costs, Public opinion, Decision making, Survival, Environment, Compatibility, Disarmament, Deterrence, Cold war, Stress (Psychology), Federal budgets, Arms control.

First of all, the author considers problems of effectiveness of any Civil Defense program. This has to do with the capability of a program to attain, to a reasonable degree, its own objectives. Secondly, he looks at the impact of Civil Defense upon the Cold War. These, as it were, are effects which we may buy by adopting measures to protect our population. They have to do with the fact that some national resources may have to be diverted from other programs; that conflict between peace and war-preparations may exist in reality, or in perceptions of people (cognitive dissonance problem); that Civil Defense may contribute to deterrence either directly or through its effect upon credibility of use of nuclear weapons; that it may increase the prospects for war. Thirdly, he considers the effects of Civil Defense upon Americans and upon the nature of our society. These are key standards against which the feasibility, worth, and meaning of alternative programs have to be evaluated.
AD-643 719 HC$3.00 MF$0.65

REAR AND SUPPLY OF THE SOVIET ARMED FORCES, NO. 5.
Department of the Army, Washington, D. C.

27 Oct 66, 138p 1-9705
Trans. of Tyl I Snabzhenie Sovetskikh Vooruzhennykh Sil (USSR) n5 p1-96 1965.

Descriptors: (*Armed forces (Foreign), USSR), (*Logistics, Armed forces (Foreign)), Armed forces supplies, Armed forces operations, Guided missiles, Combat readiness, Military personnel, Food, Armed forces transportation, Economics.

Articles included in this translation are entitled: Dependable Support for Aviation; The Rear Echelon of Missile Troops; and Missile, Air and General Army Services.
AD-644 096 HC$3.00 MF$0.65

15E. LOGISTICS

AIRCRAFT CARGO RESTRAINT SYSTEM.
All American Engineering Co., Wilmington, Del.
For primary bibliographic entry see Field 13E.
AD-643 520 HC$3.00 MF$0.65

A 1966 SURVEY OF RUSSIAN MERCHANT SHIPPING,
Washington Univ., Seattle. Applied Physics Lab.
Robert L. Nichols. 7 Oct 66, 61p APL-UW-6626
Contract NOw-65-0207

Descriptors: (*Shipping (Marine), USSR), Reviews, Merchant vessels, Maintenance, Shipyards, Harbors, Handling, Cargo ships, Management engineering.

The report surveys several different facets of the Russian merchant marine: its growth, policies, administration, types of ships, shipyards, and port facilities.
AD-643 757 HC$3.00 MF$0.65

REAR AND SUPPLY OF THE SOVIET ARMED FORCES, NO. 5.
Department of the Army, Washington, D. C.
For primary bibliographic entry see Field 15C.
AD-644 096 HC$3.00 MF$0.65

15F. NUCLEAR WARFARE

CIVIL DEFENSE ASPECTS OF MUNICIPAL WATER SYSTEMS.
Engineering-Science, Inc., Arcadia, Calif.
For primary bibliographic entry see Field 13B.
AD-643 527 HC$3.00 MF$0.65

SHORT-PERIOD PROPAGATION OF INFRASONIC WAVES FROM NUCLEAR EXPLOSIONS,
RAND Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 19D.
AD-643 536 HC$3.00 MF$0.65

RESPONSE OF DRYDOCK GATES TO BLAST LOADING.
MacNeal-Schwendler Corp., San Marino, Calif.
For primary bibliographic entry see Field 13J.
AD-643 853 HC$3.00 MF$0.65

15G. OPERATIONS, STRATEGY, AND TACTICS

CERTAIN QUESTIONS OF THE INCREASING INTERPRETATION PROPERTIES OF AERIAL PHOTOGRAPHS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 14E.
AD-643 896 HC$3.00 MF$0.65

16. MISSILE TECHNOLOGY

16C. MISSILE WARHEADS AND FUSES

ROCKET PAYLOADS.
Final rept., 1 Aug 65-31 Jul 66,
GCA Corp., Bedford, Mass. GCA Technology Div.
John R. Campos. Sep 66, 25p GCA-TR-6-8-A
AFCRL-66-690
Contract AF 19 (628)-5555

Descriptors: (*Payload, Flight testing), Cameras, Photographic techniques, Sodium, Aluminum compounds, Metalorganic compounds, Night photography, Guided missiles.
Identifiers: Aluminum methyls.

Payloads consisting of TMA and sodium were constructed and one was flown from the Eglin Test Range in Florida. Two 70-MM cameras suitable for twilight and night trail photography were designed and developed along with an adjustable camera mount for pointing in azimuth and elevation and a timing console for sequentive automatic exposures. Refinements of existing procedures for obtaining estimated wind velocity data led to the development of photographic projection technique, which can be programmed for use with a computer. (Author)
AD-643 541 HC$3.00 MF$0.65

16D. MISSILES

SELECTED OFFICIAL PUBLICATIONS, PROFESSIONAL PAPERS, AND PATENTS.
Naval Ordnance Test Station, China Lake, Calif.
For primary bibliographic entry see Field 5B.
AD-643 782 HC$3.00 MF$0.65

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. ACOUSTIC DETECTION

MAGNETOSTRICTIVE SONAR TRANSDUCERS.
Research and development rept. Jan-Sep 66,
Navy Electronics Lab., San Diego, Calif.
F. R. Abbott. 21 Sep 66, 13p NEL-1405
See also AD-639 667.

Descriptors: (*Magnetostrictive elements, *Sonar equipment), Performance (Engineering), Magnets, Design.

Preliminary study indicates that magnetostrictive drivers employing symmetrical permanent-magnet polarization and solenoidal ac excitation should be the equal of piezoelectric ceramic drivers in performance and their superior in mechanical strength. It is recommended that magnetostrictive drivers be assembled and evaluated for the principal active sonars amenable to design change. (Author)
AD-643 528 HC$3.00 MF$0.65

17B. COMMUNICATIONS

AUTOMATIC SYSTEMS IN RADIOENGINEERING DEVICES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
B. Kh. Krivitskii. 15 Sep 66, 742p FTD-HT-66-253
TT-67-60199
Unedited rough draft trans. of mono. Avtomaticheskie Sistemy Radiotekhnicheskikh Ustroistv, Moscow/Leningrad, 1962 664p.

Descriptors: (*Remote control system, Automatic), (*Radio equipment, Remote control system), (*Navigation aids, Automation), (*Radar equipment, Automation), Control systems, Direction finding, Radio waves, Oscillators, Radiofrequency, Automatic gain control, Discriminators, USSR.

The book examines, on the basis of automatic control theory, the basic automatic systems employed in contemporary radio engineering devices: systems for determining the direction of arrival of radio waves, self-excited oscillator, frequency control systems, systems for determining the time positions of pulses, and gain-control systems. Also described are the most commonly used measuring elements in these systems: amplitude, phase, frequency and time discriminators. (Author)
AD-643 593 HC$3.00 MF$0.65

SHORTWAVE DIRECTIONAL ANTENNA FOR RANGES OF 5.5-18.5 MC,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 9E.
AD-643 621 HC$3.00 MF$0.65

COMPRESSED VOICE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 17B.
AD-644 012 HC$3.00 MF$0.65

COMPRESSED VOICE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. Demidov. 7 Oct 66, 18p FTD-HT-66-202
Unedited rough draft trans. of Znanie-Sila (USSR) n11 p52-4 1963.

Descriptors: (*Voice communication systems, Intelligibility), (*Speech compression, Information theory), Vocoders, Speech, Radio communication systems, Speech representation, Speech transmission, Telephone communication systems, USSR.
AD-644 012 HC$3.00 MF$0.65

TRANSISTORIZED VOLTAGE CONVERTERS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 9E.
AD-644 069 HC$3.00 MF$0.65

ERROR BOUNDS FOR PARALLEL COMMUNICATION CHANNELS.
Massachusetts Inst. Of Tech., Cambridge. Research Lab. Of Electronics.
P. M. Ebert. 1 Aug 66, 89p NASA-CR-79494
Grants NSG-334, NSG-496

Descriptors: *Channel, *Communication, *Error, Bandwidth, Block, Coding, Gaussian noise, Length, Parallel, Power, Probability, Signal, Transmission.

For abstract, see STAR 05 02.
N67-11681 HC$3.00 MF$0.65

17D. ELECTROMAGNETIC AND ACOUSTIC COUNTERMEASURES

CATALOGUE OF SATELLITE OBSERVATIONS, NO. C-24.
Smithsonian Astrophysical Observatory, Cambridge, Mass.

D. V. Mechau. 1966, 25p NASA-CR-79505, SAO SPECIAL REPT.-68
Prepared For Nasa

Descriptors: *Nasa program, *Satellite observation, *Tracking station, Catalog, Discoverer satellite, Explorer satellite, Foreign, Greb 5 satellite, Observation, Satellite, Station, Tiros satellite, Tracking, Transit satellite, U.S.A..

For abstract, see STAR 05 02.
N67-11731 HC$3.00 MF$0.65

17G. NAVIGATION AND GUIDANCE

AUTOMATIC SYSTEMS IN RADIOENGINEERING DEVICES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 17B.
AD-643 593 HC$3.00 MF$0.65

THE HARTLOBE AIRBORNE DUAL ANTENNA SYSTEM FOR IFF. PART I. MARK X (SIF) SYSTEM.
Naval Research Lab., Washington, D. C.
For primary bibliographic entry see Field 9E.
AD-643 694 HC$3.00 MF$0.65

NAVIGATION WITH HIGH-ALTITUDE SATELLITES: A STUDY OF RANGING ERRORS.
Technical note,
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
T. J. Goblick, Jr. 26 Aug 66, 41p TN-1966-46
ESD-TR-66-418
Contract AF 19 (628)-5167

Descriptors: (*Navigation satellites, Range finding), (*Range finding, Errors), Radio signals, Radio equipment, Range finding, Airborne, Accuracy, Multipath transmission, Power, Bandwidth, Ionospheric propagation, Troposphere, Wave transmission, High altitude.

In order to determine the position of a receiver on earth to within a fraction of a mile using high-altitude satellites, 10-meter accuracy in the receiver-satellite ranges or range differences is necessary. The factors that affect ranging systems attempting to achieve such accuracies are considered here rather than the detailed design of a ranging system. It is concluded that the effects of multipath propagation on ranging accuracy for receivers in aircraft must be experimentally studied prior to any judgment of the feasibility of such accuracies. In the absence of multipath, the satellite power and bandwidth requirements and ionospheric and tropospheric effects do not prohibit 10-meter range accuracy. (Author)
AD-643 851 HC$3.00 MF$0.65

THE STABILITY OF CERTAIN CASES OF MOTION OF SOLIDS WITH ONE FIXED POINT IN A FINITE TIME INTERVAL,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. I. Vovchenko. 7 Oct 66, 10p FTD-TT-65-81
Unedited rough draft trans. of Aviatsionnyi Institut, Kazan. Trudy (USSR) n68 p3-10 1962.

Descriptors: (*Gyroscopes, Motion), Stability, Solids, Rotation, Inertia, USSR.

For heavy gyroscopes with a fixed support point and with the center of inertia on the axis of rotation, uniform rotation about the vertical axis is studied for absolute Lyapunov stability. (Author)
AD-643 894 HC$3.00 MF$0.65

TACAN TEST SIGNAL SET AND DME TEST SIGNAL SET. PHASE I.
Final rept.,
General Dynamics/Electronics, Rochester, N. Y.
F. Mimken, and V. Hazners. Nov 66, 50p
SRDS-RD-66-84
Contract FA-65-WA-1343

Descriptors: (*Navigational aids, *Test sets), Distance-measuring equipment, Feasibility studies, Maintainability, Reliability (Electronics), Airborne, Design, Microminiaturization (Electronics), Specifications.
Identifiers: TACAN.

A feasibility model TACAN test signal set and a feasibility model DME test signal set was designed, developed, and constructed. Each test set is designed for making ground checks of their respective airborne interrogator units in current use by the commercial airlines, the military, and the general aviation public. The prime objectives in this program were performance, maintainability, and reliability. In order to meet these objectives, such things as integrated circuits, modular construction, self-test, and new design concepts were utilized. (Author)
AD-643 934 HC$3.00 MF$0.65

EVALUATION OF A SEMI-ACTIVE GRAVITY GRADIENT SYSTEM. VOLUME I - TECHNICAL SUMMARY.
Trw Systems, Redondo Beach, Calif.
R. G. Nishinaga, P. C. Wheeler, H. L. Williams, and J. G. Zaremba. Nov 66, 62p NASA-CR-593
Contract NAS5-9640

Descriptors: *Attitude control, *Gravity gradient satellite, Activity, Attitude, Control, Earth, Gimbal, Gradient, Gravity, Orientation, Performance, Pitch, Reaction, Satellite, Semiautomatic, Spacecraft, System, Torque, Wheel.

For abstract, see STAR 05 02.
N67-12032 HC$3.00 MF$0.65

THREE-AXIS PARAMETERIZATION STUDY. ADVANCED LIMIT CYCLE CONTROL TECHNIQUES FOR ATTITUDE CONTROL SYSTEMS FINAL REPORT, JUN. 29, 1965 - JUN. 10, 1966.
Marquardt Corp., Van Nuys, Calif.
D. R. Slagle. 10 Jun 66, 175p NASA-CR-79498, S-545
Contract NAS8-20018

Descriptors: *Attitude control, *Computer simulation, Analog, Analysis, Characteristics, Consumption, Digital, Engine, Error, Firing, Flow, Program, Propellant, Rate, Space vehicle, Statistical, Thrust, Tolerance.

For abstract, see STAR 05 02.
N67-12050 HC$3.00 MF$0.65

EVALUATION OF A SEMI-ACTIVE GRAVITY GRADIENT SYSTEM. VOLUME II - APPENDICES.
Trw Systems, Redondo Beach, Calif.
R. G. Nishinaga, P. C. Wheeler, H. L. Williams, and J. G. Zaremba. Oct 66, 210p NASA-CR-594
Contract NAS5-9640

Descriptors: *Gravity gradient satellite, *Pitch control, Control, Damping, Evaluation, Frequency, Gimbal, Injection, Orbit, Pitch, Response, Roll, Spacecraft, Yaw.

For abstract, see STAR 05 02.
N67-12098 HC$3.00 MF$0.65

17H. OPTICAL DETECTION

BULLETIN OF STATIONS FOR OPTICAL SATELLITE TRACKING, NO. 44.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 02.
N67-11912 HC$3.00 MF$0.65

BULLETIN OF STATIONS FOR OPTICAL SATELLITE TRACKING, NO. 45.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 02.
N67-11913 HC$3.00 MF$0.65

KINETHEODOLITE OBSERVATIONS OF SATELLITES RECEIVED BY THE SATELLITE ORBITS GROUP FROM MALTA FOR JUNE 1966.
Radio And Space Research Station, Slough (England).
For primary bibliographic entry see Field 22C.
For abstract, see STAR 05 02.
N67-11914 HC$3.00 MF$0.65

ENGINEERING FEASIBILITY STUDY OF A KILOMETER WAVE ORBITING TELESCOPE, PHASE I FINAL REPORT.
Michigan Univ., Ann Arbor. Radio Astronomy Obs.
F. T. Haddock. Oct 66, 628p NASA-CR-79734
Contract 23-005-131

Descriptors: *Radio telescope, *Rhombic antenna, *Sensor, Antenna, Astronomy, Cylinder, Engineering, Feasibility, Interferometer, Kilometer, Mission, Orbit, Radio, Rhombic, Telescope, Wave.

For abstract, see STAR 05 02.
N67-12053 HC$3.00 MF$0.65

OPTICAL TECHNOLOGY APOLLO EXTENSION SYSTEM, PART I. VOLUME 1 (1 OF 2). SECTION 1 - INTRODUCTION. SECTION 2 - EXPERIMENT DEVELOPMENT FINAL TECHNICAL REPORT.
Chrysler Corp., New Orleans, La. Space Div.
21 Oct 66, 292p NASA-CR-79503
Contract NAS8-20256

Descriptors: *Apollo project, *Optical instrument, Antenna, Astronomy, Communications, Extension, Heterodyne, Instrument, Interferometer, Meteorology, Optical, Remote, Sensor, System, Technology, Telescope.

For abstract, see STAR 05 02.
N67-12054 HC$3.00 MF$0.65

OPTICAL TECHNOLOGY APOLLO EXTENSION SYSTEM, PART I. VOLUME 1 (2 OF 2). SECTION 1 - INTRODUCTION. SECTION 2 - EXPERIMENT DEVELOPMENT FINAL TECHNICAL REPORT.
Chrysler Corp., New Orleans, La. Space Div.
21 Oct 66, 441p NASA-CR-79499
Contract NAS8-20256

Descriptors: *Apollo project, *Optical instrument, Antenna, Electric, Extension, Instrument, Interferometer, Measurement, Mirror, Optical, System, Technology, Telescope, Testing, Tracking.

For abstract, see STAR 05 02.
N67-12055 HC$3.00 MF$0.65

OPTICAL TECHNOLOGY APOLLO EXTENSION SYSTEM, PART I. VOLUME II. SECTION

3 - SYSTEMS INTEGRATION FINAL TECHNICAL REPORT.
Chrysler Corp., New Orleans, La. Space Div.
21 Oct 66, 355p NASA-CR-79497
Contract NAS8-20256

Descriptors: *Apollo project, *Optical instrument, Component, Control, Environment, Extension, Instrument, Integration, Mission, Optical, Orbital, Power, Spacecraft, System, Technology, Telescope, Testing.

For abstract, see STAR 05 02.
N67-12056 HC$3.00 MF$0.65

OPTICAL TECHNOLOGY APOLLO EXTENSION SYSTEM, PART I. VOLUME III. SECTION 4 - TECHNOLOGY DEVELOPMENT PLAN FINAL TECHNICAL REPORT.
Chrysler Corp., New Orleans, La. Space Div.
21 Oct 66, 70p NASA-CR-79524
Contract NAS8-20256

Descriptors: *Apollo project, *Optical instrument, Antenna, Astronomy, Experiment, Instrument, Onboard, Optical, Solution, Telescope, Testing, Tracking.

For abstract, see STAR 05 02.
N67-12057 HC$3.00 MF$0.65

OPTICAL TECHNOLOGY APOLLO EXTENSION SYSTEM, PART I SUMMARY REPORT.
Chrysler Corp., New Orleans, La. Space Div.
21 Oct 66, 84p NASA-CR-79521
Contract NAS8-20256

Descriptors: *Apollo project, *Optical instrument, Analysis, Heterodyne, Instrument, Optical, Requirement, Summary, Technology, Telescope, Testing, Tracking.

For abstract, see STAR 05 02.
N67-12058 HC$3.00 MF$0.65

17I. RADAR DETECTION

ON THE ESTIMATION OF SIGNAL TO NOISE RATIO AND APPLICATIONS TO DETECTION AND TRACKING SYSTEMS.
Interim technical documentary rept.,
University of Southern California, Los Angeles.
N. E. Nahi, and R. M. Gagliadi. Jul 64, 26p EE-114
SSD-TDR 64-206
Contract AF 04 (695)-537

Descriptors: (*Signal-to-noise ratio, Detection), (*Spacecraft, Signal-to-noise ratio), Tracking, Narrowband, Limiters, Radiofrequency power, Measuring devices (Electrical + Electronic), Stochastic processes, Radar, Radar signals, Automatic gain control, Electric filters, Fourier analysis, Numerical analysis.

An essential problem in the detection and tracking of an object, such as a space vehicle, is the task of extracting the received signal from perturbing noise or detecting its presence. The forms of the spectra of the signal and noise are usually invariant during a mission, since these properties are determined by transfer functions of system elements such as the antenna, crystal filters, mirrors, etc. However, the power in the received signal, whether from radar or laser illumination, generally varies during any mission due to changes in target-receiver range, or changes in the properties of the media masking the target. In addition, the power in the corrupting noise will also vary as a result of changes in the clutter background. Hence, it is desirable to have a device that will estimate input signal to noise ratio when the signal and noise each have power spectra known to within a multiplying constant. In this report a technique is introduced where this ratio can be estimated during operation by means of a relatively simple mechanization. For the important special case of narrow band signal in gaussian noise, it is shown that the suggested technique can be implemented by use of a limiter and a power measuring device. (Author)
AD-446 811 HC$0.00

COMPUTER TECHNIQUES FOR THE EVALUATION OF DETECTOR PERFORMANCE.
Technical rept.,
Michigan Univ., Ann Arbor. Cooley Electronics Lab.
Joseph N. Gittelman. May 65, 84p TR 160
Contract Nonr-1224 (36)

Descriptors: (*Detectors, Effectiveness), (*Radio receivers, Performance (Engineering)), Analysis, Computers, Signals, Signal-to-noise ratio, Radio signals, Noise (Radio), Statistical analysis, Programming (Computers).

In many situations, the theory of signal detectability lacks a connection between the theoretical aspects and the practical implementation of a detector. This condition exists because there are no general techniques for evaluating the detector performance. This report contains a collection of available techniques which have been adapted for the computer evaluation of a large class of detectors. In addition to the classical approximations, the pearson system of frequency curves is integrated into the computer programs. The pearson system yields a closedform approximation to the detector performance, based on the moments of the signal and noise distribution functions. Such closed-form approximations enable the user to evaluate the effects of signal-to-noise ratio, detector nonlinearities and filter bandwidth. (Author)
AD-469 185 HC$3.00

RADAR EQUIPMENT FOR POLARIZATION INVESTIGATIONS OF CLOUDS AND PRECIPITATION.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 4B.
AD-643 641 HC$3.00 MF$0.65

METHOD OF SELECTING MOVING RADAR TARGETS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. K. Ignatev. 27 Jun 66, 5p FTD-HT-66-79
Unedited rough draft trans. of Patent (USSR) 150 140, appl. 420473/26, 23 Aug 49.

Descriptors: (*Moving target indicators, *Radar targets), Selection, Patents, USSR.

The object of the invention is a method of selecting moving radar targets with the recording of reflected signals which has distinguishing feature that for the purpose of comparing signals with subsequent reflected signals there are used three continuous alternating cycles of operation - the cycle of recording the signals in positive polarity, the cycle of recording the signals in negative polarity, and the cycle of reproduction of the recordings in the two preceding cycles. (Author)
AD-643 712 HC$3.00 MF$0.65

PULSE RADAR.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Ya. D. Shirman. 14 Jul 66, 7p FTD-TT-65-1741
Unedited rough draft trans. of Patent (USSR) 152 487, appl. 03178/700109, 21 Nov 55.

Descriptors: (*Radar pulses, *Resolution), Linear accelerators, Patents, USSR.

The object of the invention is pulse radar which has the distinguishing characteristic that for the purpose of improving the resolving capacity in its basic, or supplementary receiving devices, there are used videofrequency linear accelerators with the application of double synchronous detection. Pulse radar in accordance with Par. 1, which has the distinguishing characteristic that in its basic, or supplementary receiving devices, high-frequency linear accelerators are used - sections of a long line, the time of retardation in which is multiple to the period of high frequency, which are made up from a section matched on the input and shortened at the end, or of a combination of sections that are matched at the input and open at the end. (Author)
AD-643 730 HC$3.00 MF$0.65

TARGET DETECTION PERFORMANCE WITH A BOWTIE RADAR DISPLAY.
Technical rept.,
Human Factors Research, Inc., Santa Barbara, Calif.
C. H. Baker. Dec 66, 10p TR-750-7
Contract Nonr-4120 (00)
Availability: Published in Journal of Engineering Psychology v5 n1 p16-20 1966.

Descriptors: (*Radar equipment, Display systems), (*Detection, Performance tests), Radar targets, Airborne, Plan position indicators, Effectiveness.

A comparison was made of two airborne radar displays, the conventional Plan Position Indicator and a new type, the Bowtie display, with respect to their effectiveness for detecting relatively motionless targets. It was found that the target detection performance of observers (N = 30) using the new type display is superior to that when using the conventional display. (Author)
AD-643 893 Not available from CFSTI.

CENTRAL NAVAL SCIENTIFIC RESEARCH INSTITUTE INFORMATION COLLECTION, NO. 79 (SELECTED ARTICLES).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
R. P. Bibichkova, and I. D. Demin. 8 Aug 66, 27p FTD-MT-65-35
TT-67-60272
Edited machine trans. of Tsentralnyi Nauchno-Issledovatelskii Institut Morskogo Flota. Informatsionnyi Sbornik (USSR) n79 p31-9, 56-63 1962.

Descriptors: (*Identification systems, Radar equipment), (*Radar clutter, Ships), Radar reflections, Ocean waves, Roughness, USSR, Naval research.

Contents: Pilot identification instruments; The effect of sea roughness on radar visibility of small ships.
AD-643 974 HC$3.00 MF$0.65

A REAL-TIME COMPUTING SYSTEM FOR REDUCING RADAR CROSS-SECTION DATA TO MEDIAN VALUES.
Technical memo.,
Naval Missile Center, Point Mugu, Calif.
D. Mensa, and K. Doi. 2 Nov 66, 31p NMC-TM-66-49

Descriptors: (*Radar echo areas, Data processing systems), Real time, Computers, Probability, Distribution functions.

The report describes the development of a real-time computing system to reduce radar cross-section data to median values. The concept, mechanization, and performance of the system are described. (Author)
AD-643 988 HC$3.00 MF$0.65

RADAR LOCATION OF MOVING TARGETS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.

P. A. Bakulev. 27 May 66. 317p FTD-MT-64-554
TT-67-60328
Edited machine trans. of mono. Radiolokatsiya Dvizhushchikhsya Tselei, Moscow, 1964 336p.

Descriptors: (*Moving target indicators, *Target acquisition). Radar signals, Doppler effect, Continuous wave radar, Doppler radar, Coherent radar, Oscillation, Performance (Engineering), USSR.

The book presents theory and technology of radar devices intended for radiolocation of moving targets on background of interferences of natural and artificial origin. In it are considered physical bases, principles of construction, and possibility of technical realization of radars of selection of moving targets (SDTs). The connection is analyzed between the tactical indices of radar SDTs and their technical parameters. It considers interaction of elements and nodes of radar stations SDTs; requirements presented to these elements and nodes are determined from the point of view of obtaining necessary quality of radar operation. There is conducted an analysis of different, in assignment, SDTs systems in their most characteristic operating conditions. (Author)
AD-644 144 HC$3.00 MF$0.65

REMOTE DETECTION OF CLEAR AIR TURBULENCE. PART I - PULSED MICROWAVE RADARS.
Texas Univ., Houston. Electrical Engineering Research Lab.
B. M. Fannin. 1 Nov 66, 32p NASA-CR-79922, P-13
Contract NGR-44-012-048

Descriptors: *Clear air turbulence, *Microwave scattering, *Radar scattering, *Weather radar, Air, Backscatter, Calculation, Clear, Detection, Flight, Ground, Level, Microwave, Model, Power, Radar, Scattering, System, Test, Turbulence, Weather.

For abstract, see STAR 05 02.
N67-11852 HC$3.00 MF$0.65

TERRAIN ANALYSIS BY ELECTROMAGNETIC MEANS TECHNICAL REPORT, NOV. 1964 - APR. 1965.
Army Engineer Waterways Experiment Station, Vicksburg, Miss.
J. R. Lundien. Sep 66, 98p NASA-CR-79924, TR-3-693
NASA ORDER R-25-04-001

Descriptors: *Earth surface, *Radar scanning, *Subsurface, *Vegetation, Density, Detection, Earth, Growth, Interface, Moisture, Property, Radar, Scanning, Sensor, Soil, Surface.

For abstract, see STAR 05 02.
N67-11854 HC$3.00 MF$0.65

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. FUSION DEVICES (THERMONUCLEAR)

CRITICAL LENGTH DETERMINATION FOR CONVECTIVE INSTABILITIES IN WEAKLY INHOMOGENEOUS PLASMAS.
General Dynamics Corp., San Diego, Calif. General Atomic Div.
For primary bibliographic entry see Field 20I.
AD-643 662 Not available from CFSTI.

NUCLEAR FUSION VOL 6 NO. 2 1966: SELECTED ARTICLES.
Technical Information Extension (AEC) Oak Ridge, Tenn.
1966, 76p
TT-67-60180

Descriptors: (*Plasma physics, Thermonuclear reactions), (*Thermonuclear reactions, Plasma oscillations).

For abstract, see NSA 20 24.
AEC-TR-6674 HC$3.00 MF$0.65

PULSED FIELD SKIN EFFECT CALCULATIONS FOR CYLINDRICAL CONDUCTORS,
Los Alamos Scientific Lab., N. Mex.
D. A. Baker, M. D. J. Macroberts, and L. W. Mann. May 66, 99p
Contract W-7405-eng-36

Descriptors: (*Magnetic fields, Penetration), (*Thermonuclear reactions, Theory).

For abstract, see NSA 20 24.
LA-3500 HC$3.00 MF$0.65

18B. ISOTOPES

RADIATION BACKSCATTERING AND RADIATION-INDUCED X-RAYS FOR MEASURING SURFACE COMPOSITION AND STRUCTURE,
Frankford Arsenal, Philadelphia, Pa. Pittman-Dunn Research Labs.
Sigmund Berk. Jun 66, 8p
FA-A66-14
Availability: Published in Unidentified publication.

Descriptors: (*Promethium, Radioactive isotopes), (*Radioactive isotopes, Nuclear industrial applications), Backscattering, Beta particles, X rays, Copper, Plastic coatings, Corrosion, Oxidation, Surfaces, Half life, Radiation measurement systems, Metals, Instrumentation, Radioactivity.

The use of promethium-147 beta backscattering to measure the thickness of plastic coatings on copper was determined. Backscattering radiation was also used to determine the structure and surface composition of copper specimens. A preliminary study of the use of beta-particle backscattering and beta-particle-induced X-rays for measuring corrosion is described.
AD-643 858 Not available from CFSTI.

PRODUCTION OF 204 TL FROM THALLIUM OXIDE,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
For primary bibliographic entry see Field 7E.
For abstract, see NSA 20 24.
DP-1033 HC$3.00 MF$0.65

REVIEW OF RADIOISOTOPES PROGRAM, 1965,
Oak Ridge National Lab., Tenn.
J. H. Gillette. Sep 66, 34p
Contract W-7405-eng-26

Descriptors: (*Radioactive isotopes, Production), (*Research reactors, Radioactive isotopes).

For abstract, see NSA 20 24.
ORNL-4013 HC$3.00 MF$0.65

18C. NUCLEAR EXPLOSIONS

DEVELOPMENT OF AN IMPROVED LAND-SURFACE FALLOUT MODEL. PART I. INTRODUCTION AND SUMMARY.
Technical Operations Research, Burlington, Mass.
For primary bibliographic entry see Field 18H.
AD-643 534 HC$3.00 MF$0.65

18D. NUCLEAR INSTRUMENTATION

NUCLEAR DETECTORS AND THEIR USES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Wang Chu-hsian. 19 Sep 66, 771p FTD-TT-65-552
TT-67-60201
Edited trans. from Ho Wu Li T'an Ts'e Ch'i i Chi Ch'i Ying Yung, n.p. 1964 567p.

Descriptors: (*Radiation measurement systems, Experimental data), Ionization chambers, Proportional counters, Geiger counters, Crystal counters, Semiconductor devices, Scintillation counters, Cerenkov radiation, Photographic emulsions, Cloud chambers, Bubble chambers, Neutron detectors, Coincidence counting, Statistical analysis, China.
Identifiers: Alkaline counters, Crystal counters, Spark chambers.

The present volume provides a comprehensive and systematic introduction to detection technique in nuclear physics. It is divided into four parts: the fundamentals of nucleonic experiment; the various types of detectors (the major part of the book); synchronous application of detectors; and the reduction of experimental data. The book is based on the manuscripts of a series of lectures on 'Experimental Methods in Nuclear Physics' given by the author at Chinese University of Science and Technology, supplemented by some new material.
AD-643 601 HC$3.00 MF$0.65

THE CONSTRUCTION, CALIBRATION AND OPERATION OF THE UNIVERSITY OF MINNESOTA EXPERIMENTS FOR OGO-I AND OGO-III.
Minnesota Univ., Minneapolis. Cosmic Ray Group.
For primary bibliographic entry see Field 22B.
AD-643 865 HC$3.00 MF$0.65

ENERGY DEPENDENCE OF FREE RADICAL PRODUCTION IN ALANINE,
School of Aerospace Medicine, Brooks AFB, Tex.
For primary bibliographic entry see Field 7E.
AD-643 884 Not available from CFSTI.

SEMICONDUCTOR NUCLEAR PARTICLE COUNTERS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
S. M. Ryvkin, O. A. Matveev, and N. B. Strokan. 16 Aug 66, 57p FTD-MT-65-138
TT-67-60286
Edited machine trans. of Poluprovodnikovye Schetchiki Yadernykh Chastits (USSR) v10 40p 1964.

Descriptors: (*Semiconductor devices, *Radiation measurement systems), (*Nuclear particles, Counting methods), Crystal counters, Nuclear radiation spectrometers, USSR.

Contents: Contemporary Spectrometric n-p Counters; and Possibilities of Use of Homogeneous Semiconductors as Counters.
AD-644 024 HC$3.00 MF$0.65

CHARGE COLLECTION AND CHARGE-COLLECTION TIME IN SEMICONDUCTOR PARTICLE DETECTORS,
Argonne National Lab., Ill.
Niels J. Hansen. Jun 66, 27p
Contract W-31-109-eng-38

Descriptors: (*Charged particles, Detectors), (*Radiation measurement systems, Charged particles).

For abstract, see NSA 20 24.
ANL-7226 HC$3.00 MF$0.65

NEUTRON COUNTER FOR ANALYTICAL APPLICATIONS,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
T. Richard Herold, and H. Perry Holcomb. Aug 66, 18p
Contract AT (07-2)-1

Descriptors: (*Neutron counters, Fission neutrons), (*Radioactive isotopes, Radiation measurement systems).

For abstract, see NSA 20 24.
DP-1035 HC$3.00 MF$0.65

POINT SOURCE DETECTION BY SCINTILLATION SURVEY METER,
New York Operations Office (AEC), N. Y. Health and Safety Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 20 24.
HASL-177 HC$3.00 MF$0.65

AUTOMATIC SAMPLER FOR COLLECTING RADIOACTIVE PARTICULATES IN GROUND LEVEL AIR,
New York Operations Office (AEC), N. Y. Health and Safety Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 20 24.
HASL-178 HC$3.00 MF$0.65

NEUTRON SPECTROMETER UTILIZING THE PRINCIPLE OF CHARGED PARTICLE COLLIMATION,
Mound Lab., Miamisburg, Ohio.
Richard A. Wolfe, and Warren Fenton Stubbins. 27 May 66, 39p
Contract AT (33-1)-GEN-53

Descriptors: (*Nuclear radiation spectrometers, Charged particles), (*Charged particles, Collimators).

For abstract, see NSA 20 24.
MLM-1339 HC$3.00 MF$0.65

THE UNIVERSITY OF NEW HAMPSHIRE MAGNETIC FIELD OBSERVATORY NUCLEAR MAGNETOMETER.
New Hampshire Univ., Durham. Dept. Of Physics.
W. Sawyer. 1962, 59p NASA-CR-79314, UNH-66-5
Contract NAS5-3043, Grant NSG-33-60

Descriptors: *Magnetometer, *Nuclear energy, Counter, Energy, Field, Frequency, Hydrogen, Magnetic, Nuclear, Nucleon, Operation, Polarization, Precession, Signal, Strength, Theory.

For abstract, see STAR 05 02.
N67-12216 HC$3.00 MF$0.65

ABSOLUTE EFFICIENCY MEASUREMENTS OF NE-213 ORGANIC PHOSPHORS FOR DETECTING 14.4- AND 2.6-MEV NEUTRONS,
Oak Ridge National Lab., Tenn.
T. A. Love, R. T. Santoro, and R. W. Peelle. Sep 66, 43p
Contract W-7405-eng-26

Descriptors: (*Charged particles, Radiation measurement systems), (*Fast neutrons, Monte Carlo method).

For abstract, see NSA 20 24.
ORNL-3893 HC$3.00 MF$0.65

NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 31, 1966.
Oak Ridge National Lab., Tenn.
Sep 66, 36p
Contract W-7405-eng-26

Descriptors: (*Reactor shielding calculations, Radiation measurement systems), (*Spacecraft, Reactor shielding calculations).

For abstract, see NSA 20 24.
ORNL-3973 Vol 2 HC$3.00 MF$0.65

HIGH-VOLTAGE LITHIUM-DRIFTED SILICON DETECTORS,
California Univ., Berkeley. Lawrence Radiation Lab.
Robert P. Lothrop, and F. S. Goulding. Apr 66, 13p
Contract W-7405-eng-48

Descriptors: (*Detectors, Voltage), (*Silicon, Lithium).

For abstract, see NSA 20 24.
UCRL-16718 HC$3.00 MF$0.65

18E. NUCLEAR POWER PLANTS

JPL FISSION-ELECTRIC CELL EXPERIMENT.
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
W. F. Krieve. 15 Nov 66, 24p NASA-CR-79940, JPL-TR-32-981
Contract NAS7-100

Descriptors: *Fission electric cell, *Neutron flux, *Test reactor, *Thermal neutron, Anode, Cathode, Cell, Concentric, Current, Cylinder, Design, Electric, Experiment, Field, Fission, Flux, Large, Magnetic, Measurement, Neutron, Nuclear, Reactor, Suppression, Test, Thermal.

For abstract, see STAR 05 02.
N67-11819 HC$3.00 MF$0.65

18F. RADIATION SHIELDING AND PROTECTION

ATTENUATION OF NITROGEN-CAPTURE GAMMA RAYS IN CONCRETE.
Virginia Univ., Charlottesville.
W. Reed Johnson. Nov 66, 59p
NDL-TR-82
Grant DA-AMC-18-035-75 (A)

Descriptors: (*Shielding, *Concrete), (*Gamma rays, Attenuation), Nuclear reactions, Nitrogen, Dosimeters, Collimators, Neutron capture, Dose rate.

Shielding experiments were performed to measure the attenuation by concrete slabs of nitrogen-capture gamma radiation. A collimated capture gamma-ray beam was produced by placing a Be3N2 target in the reactor end of a tangential beam hole. A 2-inch diameter beam with an average intensity of approximately 43 mR/h was allowed to impinge at the center of an ordinary concrete-slab shield; this shield was approximately 4-1/2 feet on a side and ranged from 4 to 24 inches thick. The slabs of the shield were rotated to allow measurements at beam angles of incidence of 90, 60, and 45 degrees. The gamma-ray exposure was integrated in a plane behind and parallel to the shield for each shield thickness and angle of incidence. The integrated exposure was determined by summing individual measurements made in a regular pattern in the plane behind the shield. (Author)
AD-643 754 HC$3.00 MF$0.65

DIFFERENTIAL FAST-NEUTRON ALBEDOS FOR CONCRETE. II. RESULTS OF MONTE CARLO CALCULATIONS FOR AN INCIDENT ANGLE OF 0 DEG,
Oak Ridge National Lab., Tenn.
R. E. Maerker. Jul 65, 131p ORNL-3822-Vol-2
Contract W-7405-eng-26, DASA Order-EO-802-65
See also AD-622 329, AD-644 101.

Descriptors: (*Fast neutrons, Albedo), (*Concrete, *Albedo), Shielding, Neutron beams, Reflection, Monte Carlo method, Tables.

The report is one of a series of six reports presenting experimental and calculated differential fast-neutron albedos for concrete. The experiment was conducted at the ORNL Tower Shielding Facility and consisted of measuring neutrons reflected at various angles from a concrete slab which had been placed in a highly collimated beam of neutrons from the TSR-II (four angles of incidence). The calculations were performed with the 05R Monte Carlo computer code and covered six different source energy bands for each angle of incidence of a 'gun barrel' source of monodirectional neutrons. Volume II presents the machine output in detail, for a different angle of incidence of 0 deg.
AD-644 100 HC$3.00 MF$0.65

DIFFERENTIAL FAST-NEUTRON ALBEDOS FOR CONCRETE. III. RESULTS OF MONTE CARLO CALCULATIONS FOR AN INCIDENT ANGLE OF 45 DEG,
Oak Ridge National Lab., Tenn.
R. E. Maerker. Jul 65, 232p ORNL-3822-Vol-3
Contract W-7405-eng-26, DASA Order-EO-802-65
See also AD-622 329, AD-644 100, AD-644 102.

Descriptors: (*Fast neutrons, Albedo), (*Concrete, *Albedo), Shielding, Neutron beams, Reflection, Monte Carlo method, Tables.

The report is one of a series of six reports presenting experimental and calculated differential fast-neutron albedos for concrete. The experiment was conducted at the ORNL Tower Shielding Facility and consisted of measuring neutrons reflected at various angles from a concrete slab which had been placed in a highly collimated beam of neutrons from the TSR-II (four angles of incidence). The calculations were performed with the 05R Monte Carlo computer code and covered six different source energy bands for each angle of incidence of a 'gun barrel' source of monodirectional neutrons. Volume III presents the machine output in detail for a different angle of incidence of 45 deg.
AD-644 101 HC$3.00 MF$0.65

DIFFERENTIAL FAST-NEUTRON ALBEDOS FOR CONCRETE. IV. RESULTS OF MONTE CARLO CALCULATIONS FOR AN INCIDENT ANGLE OF 60 DEG,
Oak Ridge National Lab., Tenn.
R. E. Maerker. Jul 65, 232p ORNL-3822-Vol-4
Contract W-7405-eng-26, DASA Order-EO-802-65
See also AD-622 329, AD-644 101, AD-622 103.

Descriptors: (*Fast neutrons, Albedo), (*Concrete, *Albedo), Shielding, Neutron beams, Reflection, Monte Carlo method, Tables.

The report is one of a series of six reports presenting experimental and calculated differential fast-neutron albedos for concrete. The experiment was conducted at the ORNL Tower Shielding Facility and consisted of measuring neutrons reflected at various angles from a concrete slab which had been placed in a highly collimated beam of neutrons from the TSR-II (four angles of incidence). The calculations were performed with the O5R Monte Carlo computer code and covered six different source energy bands for each angle of incidence of a 'gun barrel' source of monodirectional neutrons. Volume IV presents the machine output in detail for a different angle of incidence of 60 deg.
AD-644 102 HC$3.00 MF$0.65

DIFFERENTIAL FAST-NEUTRON ALBEDOS FOR CONCRETE. V. RESULTS OF MONTE CARLO CALCULATIONS FOR AN INCIDENT ANGLE OF 75 DEG,
Oak Ridge National Lab., Tenn.
R. E. Maerker. Jul 65, 232p ORNL-3822-Vol-5
Contract W-7405-eng-26, DASA Order-EO-802-65
Superseded ORNL-3822-Vol-5, AD-622 303.
See also AD-622 329, AD-644 102, AD-644 104.

Descriptors: (*Fast neutrons, Albedo), (*Concrete, *Albedo), Shielding, Neutron beams, Reflection, Monte Carlo method, Tables.

The report is one of a series of six reports presenting experimental and calculated differential fast-neutron albedos for concrete. The experiment was conducted at the ORNL Tower Shielding Facility and consisted of measuring neutrons reflected at various angles from a concrete slab which had been placed in a highly collimated beam of neutrons from the TSR-II (four angles of incidence). The calculations were performed with the O5R Monte Carlo angle of incidence of a 'gun barrel' source of monodirectional neutrons. Volume V presents the machine output in detail for a different angle of incidence of 75 deg.
AD-644 103 HC$3.00 MF$0.65

DIFFERENTIAL FAST-NEUTRON ALBEDOS FOR CONCRETE. VI. RESULTS OF MONTE CARLO CALCULATIONS FOR AN INCIDENT ANGLE OF 85 DEG,
Oak Ridge National Lab., Tenn.
R. E. Maerker. Jul 65, 232p ORNL-3822-Vol-6
Contract W-7405-eng-26, DASA Order-EO-802-65
See also AD-622 329, AD-644 103.

Descriptors: (*Fast neutrons, Albedo), (*Concrete, *Albedo), Shielding, Neutron beams, Reflection, Monte Carlo method, Tables.

The report is one of a series of six reports presenting experimental and calculated differential fast-neutron albedos for concrete. The experiment was conducted at the ORNL Tower Shielding Facility and consisted of measuring neutrons reflected at various angles from a concrete slab which had been placed in a highly collimated beam of neutrons from the TSR-II (four angles of incidence). The calculations were performed with the O5R Monte Carlo computer code and covered six different source energy bands for each angle of incidence of a 'gun barrel' source of monodirectional neutrons. Volume VI presents the machine output in detail for a different angle of incidence of 85 deg.
AD-644 104 HC$3.00 MF$0.65

18H. RADIOACTIVITY

HUGONIOT DATA FROM SHOCK-INDUCED POLARIZATION EXPERIMENTS WITH GAMMA-IRRADIATED POLYETHYLENE.
Ballistic Research Labs., Aberdeen Proving Ground, Md.
For primary bibliographic entry see Field 11I.
AD-643 522 HC$3.00 MF$0.65

DEVELOPMENT OF AN IMPROVED LAND-SURFACE FALLOUT MODEL. PART I. INTRODUCTION AND SUMMARY.
Final technical rept., 31 Mar 65-31 Jan 67,
Technical Operations Research, Burlington, Mass.
H. G. Norment, T. W. Schwenke, and I. Kohlberg. Dec 66, 45p TO-B-66-80
ECOM-01309-F
Contract DA-28-043-AMC-01309 (E)

Descriptors: (*Radioactive fallout, Mathematical models), Programming (Computers), Transport properties, Clouds, Nuclear explosions, Atmosphere models, Thermal properties.

A design for the overall Department of Defense Land Fallout Prediction System (DELFIC) was completed and successfully tested by operation on the IBM 7094 computer. Several of the major component parts of the system were developed in their entirety at Technical Operations Research. These include the Initial Conditions Module (under contract DA 18-035-AMC-346 (A)), the Transport Module, and the Output Processor Module (under contract DA 18-035-AMC-737 (A)). In addition, an extensive effort was devoted to development of a cloud rise model that is appropriate for use with the DELFIC system; the model is to be used in the initial version of the system. (Author)
AD-643 534 HC$3.00 MF$0.65

ALTERATION OF THE DECAY CONSTANT OF Te125m BY CHEMICAL MEANS,
Harvard Univ., Cambridge, Mass. Lyman Lab. of Physics.
A. C. Malliaris, and Kenneth T. Bainbridge. 4 Apr 66, 7p
Contract Nonr-1866 (19)
Availability: Published in The Physical Review v149 n3 p958-64 Sep 23 1966.

Descriptors: (*Tellurium, *Radioactive decay), Nuclear isomers, Decay schemes, Tellurium compounds, Tellurides, Oxides, Silver compounds, Internal conversion.
Identifiers: Silver telluride, Tellurium oxides.

The total rate of a nuclear transition which proceeds partially by internal conversion may be expected to change when alterations are produced in the states of the electrons concerned. Such alterations may be produced, for instance, by chemical means. Differences in the decay constant of the highly converted isomeric transitions of Te125m were measured using Te, TeO2, and Ag2Te (synthetic hessite). (Author)
AD-643 592 Not available from CFSTI.

THE ISOTOPIC COMPOSITION OF STRONTIUM IN SURFACE WATER FROM THE NORTH ATLANTIC OCEAN.
Massachusetts Inst. of Tech., Cambridge. Dept. of Geology and Geophysics.
For primary bibliographic entry see Field 8J.
AD-643 616 Not available from CFSTI.

BETA DOSE RATES FROM NEUTRON-IRRADIATED URANIUM-235 CARBIDE PARTICLES,
Naval Radiological Defense Lab., San Francisco, Calif.
For primary bibliographic entry see Field 6R.
AD-643 651 HC$3.00 MF$0.65

THE DIURNAL OSCILLATIONS OF RADON AND THORON AND THEIR DECAY PRODUCTS.
Arizona Univ., Tucson. Inst. of Atmospheric Physics.
For primary bibliographic entry see Field 4A.
AD-643 743 Not available from CFSTI.

EFFECT OF GAMMA RADIATION ON THE DIELECTRIC PROPERTIES OF VACUUM DENSE CERAMICS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11B.
AD-643 924 HC$3.00 MF$0.65

COMPUTER INVESTIGATION OF RADIATION DAMAGE IN CRYSTALS.
Atomics International, Canoga Park, Calif.
For primary bibliographic entry see Field 20B.
AD-643 956 HC$3.00 MF$0.65

THE INTERACTION OF NEUTRONS WITH URANIUM-235 NUCLEI IN THE ENERGY REGION OF 0.002-30 KEV,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20H.
AD-643 958 HC$3.00 MF$0.65

THE USE OF ELECTRONIC COMPUTERS TO CALCULATE RADIATION DISTURBANCES IN METALS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. N. Orlov. 2 Sep 66, 14p FTD-HT-66-433
Unedited rough draft trans. of Akademiya Nauk SSSR. Otdelenie Matematicheskikh i Estestvennykh Nauk. Izvestiya, p288-93 1962.

Descriptors: (*Metals, Radiation damage), (*Radiation damage, Mathematical models), Transport properties, Equations of motion, Atoms, Mathematical models, Crystal lattice defects, USSR.

The analysis leads to the following general conclusions: (1) The threshold energy of the formation of a Frenkel pair during collisions in the directions <100> and <110> lies around 25 ev, and for the direction <111>, around 85 ev. (2) A focused transfer of displacements along the direction <110> is observed at E < 30 ev, along the direction <100>, at E < 40 ev. The energy losses for one collision are 0.7 and 7 - 8 ev respectively. (3) More substituted atoms than displaced atoms arise in the region of the disturbance. (4) If the energy of the primary atom exceeds the threshold energy only slightly, Frenkel pairs of different types are formed, but the positions of the interstitial atoms are different from those proposed in works. (5) At low energies the motions of atoms resemble thermal peaks; however, energy transfer in the peak is sharply anisotropic. The calculated problems do not at all exhaust the possibilities of this method of studying condensed phases. It is proposed to increase the number of atoms in the model and find a more precise definition of the law of atomic interaction. (Author)
AD-644 051 HC$3.00 MF$0.65

ENDOGENOUS BIOCHEMISTRY OF PLANARIANS CORRELATED WITH LEARNING EXPERIMENTS AT BROOKHAVEN NATIONAL LABORATORY,
Brookhaven National Lab., Upton, N. Y.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 20 24.
BNL-981 HC$3.00 MF$0.65

OBSERVATIONS OF RADIOACTIVITY, 1965.
Finnish Meteorological Office, Helsinki.
V. A. Helminen, and R. Mattsson. 1 May 66, 66p REPT.-5

Descriptors: *Air sampling, *Finland, *Radioactivity, Activity, Aerosol, Beta, Decay, Dust, Measurement, Meteorology, Precipitation, Rain, Water.

Group 18H — Radioactivity

For abstract, see STAR 05 02.
N67-11870 HC$3.00 MF$0.65

NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 31, 1966.
Oak Ridge National Lab., Tenn.
Sep 66, 73p
Contract W-7405-eng-26

Descriptors: (*Reactor shielding materials, Nuclear engineering), (*Nuclear reactors, Reactor shielding materials).

For abstract, see NSA 20 24.
ORNL-3973 Vol I HC$3.00 MF$0.65

A GRAPHICAL METHOD FOR CALCULATING THE DOSE IN MAN FROM INDIVIDUAL RADIONUCLIDES IN FALLOUT,
California Univ., Livermore. Lawrence Radiation Lab.
For primary bibliographic entry see Field 6R.
For abstract, see NSA 20 24.
UCRL-14922 HC$3.00 MF$0.65

18I. REACTOR ENGINEERING AND OPERATION

PROCUREMENT AND PROCESSING OF EBR-I CORE IV URANIUM AND HARDWARE.
Final rept.,
Argonne National Lab., Ill.
R. A. Beatty, F. D. McCuaig, and C. H. Bean.
Mar 66, 41p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuel elements, Reactor cores), (*Reactor system components, Nuclear reactors).

For abstract, see NSA 20 24.
ANL-6621 HC$3.00 MF$0.65

DEFORMATION ANALYSIS OF A CIRCULAR COUPLED-PLATE STRUCTURE,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 20K.
For abstract, see NSA 20 24.
ANL-7145 HC$3.00 MF$0.65

PLUTONIUM ABSTRACTS, VOLUME 6, NUMBER 7.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 5B.
For abstract, see NSA 20 24.
BNWL-113-19 HC$3.00 MF$0.65

PHYSICS RESEARCH QUARTERLY REPORT, JANUARY-MARCH 1966.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
Mar 66, 26p
Contract AT (45-1)-1830

Descriptors: (*Thermal reactors, Reports), (*Nuclear engineering, Scientific research).

For abstract, see NSA 20 24.
BNWL-284 HC$3.00 MF$0.65

A COMPUTER PROGRAM FOR THE OPTIMIZATION OF ORGANIC-COOLED D20 REACTORS,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
James W. Wade. Apr 66, 219p
Contract AT (07-2)-1

Descriptors: (*Organic cooled reactors, Programming (Computers)), (*Programming (Computers), Optimization).

For abstract, see NSA 20 24.
DP-1007 HC$3.00 MF$0.65

LATTICE MEASUREMENTS ON TUBULAR FUEL ASSEMBLIES IN D20,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
Harold R. Fike. Aug 66, 16p
Contract AT (07-2)-1

Descriptors: (*Reactor lattice parameters, Power reactors), (*Power reactors, Reactor coolants).

For abstract, see NSA 20 24.
DP-1054 HC$3.00 MF$0.65

THE CONTROL OF A NUCLEAR REACTOR USING HELIUM- 3 GAS CONTROL ELEMENTS.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
H. W. Davison, C. A. Heath, and W. Lowen.
1966, 14p NASA-TM-X-52256
Presented At The Am- Nucl. Soc. Winter Meeting, Pittsburgh, 30 Oct. - 3 Nov. 1966

Descriptors: *Control system, *Helium, *Water moderated reactor, Absorption, Control, Coupling, Density, Flow, Gas, Moderation, Neutron, Orifice, Poison, Pressure, Reactor, System, Thermal, Water.

For abstract, see STAR 05 02.
N67-11337 HC$3.00 MF$0.65

FUEL CYCLES IN PHWR AND CANDU TYPE REACTORS.
India. Dept. Of Atomic Energy, Bombay.
H. K. Bhatia, A. N. Nakra, B. P. Rastogi, K. R. Srinivasan, and T. A. Subramanian. 1966, 32p
AEET-252
Presented At The Symp. On Thorium Fuel Cycles, Gatlinburg, Tenn., 3-6 May 1966

Descriptors: *Thorium, *Water moderated reactor, Buckling, Cycle, Fuel, Irradiation, Moderator, Physics, Plutonium, Pressure, Reactor, Recycle, Thermal, Tube, Vessel, Water.

For abstract, see STAR 05 02.
N67-11758 HC$3.00 MF$0.65

CHEMICAL TECHNOLOGY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 31, 1966.
Oak Ridge National Lab., Tenn.
Sep 66, 287p
Contract W-7405-eng-26

Descriptors: (*Nuclear engineering, Chemistry), (*Chemistry, Reactor materials).

For abstract, see NSA 20 24.
ORNL-3945 HC$3.00 MF$0.65

18J. REACTOR MATERIALS

PROCUREMENT AND PROCESSING OF EBR-I CORE IV URANIUM AND HARDWARE.
Argonne National Lab., Ill.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 20 24.
ANL-6621 HC$3.00 MF$0.65

COMPARISON OF THE RADIATION STABILITY OF UO2-ZRO2 WITH THAT OF UO2 AND UO2-BEO,
Battelle Memorial Inst., Columbus, Ohio.
James H. Saling, Thomas R. Wright, and Earle O. Fromm. 15 Aug 66, 43p
Contract W-7405-eng-92

Descriptors: (*Radioactivity, Reactor fuels), (*Reactor fuels, Stability)

For abstract, see NSA 20 24.
BMI-1782 HC$3.00 MF$0.65

PHYSICS RESEARCH QUARTERLY REPORT, JANUARY-MARCH 1966.
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 20 24.
BNWL-284 HC$3.00 MF$0.65

YIELD OF CURIUM-244 IN THE SRP HIGH FLUX REACTOR,
Savannah River Lab., Aiken, S. C.
E. K. Dukes, R. L. Folger, C. J. Banick, G. A. Carothers, and M. Y. Donnan. Aug 66, 10p
Contract AT (07-2)-1

Descriptors: (*Curium, Radioactive isotopes), (*Transuranium compounds, Production).

For abstract, see NSA 20 24.
DP-1046 HC$3.00 MF$0.65

LATTICE MEASUREMENTS ON TUBULAR FUEL ASSEMBLIES IN D20,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 20 24.
DP-1054 HC$3.00 MF$0.65

THE IRRADIATION OF LIQUID PLUTONIUM FUELS IN A THERMAL REACTOR,
Los Alamos Scientific Lab., N. Mex.
Richard L. Cubitt, George L. Ragan, and Donald C. Kirkpatrick. Apr 66, 30p
Contract W-7405-eng-36

Descriptors: (*Thermal reactors, Reactor fuels), (*Liquid metals, Plutonium).

For abstract, see NSA 20 24.
LA-3557 HC$3.00 MF$0.65

GREEN SALT-WATER EQUILIBRIUM STUDIES,
Mallinckrodt Chemical Works, Weldon Spring, Mo. Uranium Div.
W. S. Fleming, and R. F. Leifield. 1 Aug 66, 38p
Contract W-14-108-eng-8

Descriptors: (*Water vapor, Sorption), (*Uranium compounds, Fluorides).

For abstract, see NSA 20 24.
MCW-1448 HC$3.00 MF$0.65

FUEL CYCLES IN PHWR AND CANDU TYPE REACTORS.
India. Dept. Of Atomic Energy, Bombay.
For primary bibliographic entry see Field 18I.
For abstract, see STAR 05 02.
N67-11758 HC$3.00 MF$0.65

EXTRACTION OF TUNGSTEN FROM WOLFRAMITE.
India. Dept. Of Atomic Energy, Bombay.
T. R. Bhat, and Y. W. Gokhale. 1966, 24p
AEET-251

Descriptors: *Extraction, *Tungsten, Acid, Ammonium, Calcium, Carbonate, Chloride, Leaching, Nitrate, Process, Sodium.

For abstract, see STAR 05 02.
N67-11759 HC$3.00 MF$0.65

18L. REACTORS (POWER)

A COMPUTER PROGRAM FOR THE OPTIMIZATION OF ORGANIC-COOLED D20 REACTORS,
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
For primary bibliographic entry see Field 18I.
For abstract, see NSA 20 24.
DP-1007 HC$3.00 MF$0.65

NUCLEAR RESEARCH SHIP " OTTO HAHN" ANNUAL REPORT, FOR 1965.
Gesellschaft Fur Kernenergieverwertung, Hamburg (West Germany).
Aug 66, 103p EUR-3066.D
Contract EURATOM-009-64-7-PNID
In German, English Summary

Descriptors: *Nuclear power plant, *Research vehicle, *Ship, Construction, Military, Nuclear, Plant, Power, Propulsion, Reactor, Research, Vehicle.

For abstract, see STAR 05 02.
N67-11906 HC$3.00 MF$0.65

18M. REACTORS (NON-POWER)

THE IRRADIATION OF LIQUID PLUTONIUM FUELS IN A THERMAL REACTOR,
Los Alamos Scientific Lab., N. Mex.
For primary bibliographic entry see Field 18J.
For abstract, see NSA 20 24.
LA-3557 HC$3.00 MF$0.65

18N. SNAP TECHNOLOGY

DYNAMIC TESTING OF SNAP III RADIOISOTOPE THERMOELECTRIC GENERATOR.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
O. C. Kardatzke. Aug 66, 18p NASA-TM-X-55603, X-716-66-374

Descriptors: *Output, *Thermoelectric conversion system, Conversion, Dynamic, Generator, Material, Measurement, Performance, Power, Radioactivity, Snap- 3, System, Testing, Thermal, Thermoelectric.

For abstract, see STAR 05 02.
N67-11377 HC$3.00 MF$0.65

19. ORDNANCE

19A. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

FEASIBILITY OF LAUNCHING MICRON-SIZE PARTICLES AT SPEEDS OF 12,000 FT/SEC TO 18,000 FT/SEC.
Ballastic Research Labs., Aberdeen Proving Ground, Md.
For primary bibliographic entry see Field 19D.
AD-643 537 HC$3.00 MF$0.65

THEORY OF EXPLOSIVE SUBSTANCES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
K. K. Andreev, and A. F. Belyaev. 7 Oct 66, 859p FTD-MT-64-242
TT-67-60200
Edited machine trans. of mono. Teoriya Vzryvchatykh Veshchestv, Moscow, 1960 595p.

Descriptors: (*Explosive materials, Theory), Energy, Explosions, Explosive gases, Reaction kinetics, Chemical reactions, Transformations, Stability, Burning rate, Detonations, Powders, Liquids, Excitation, Sensitivity, Shock waves, Combustion, Safety, USSR.

The basic physicochemical properties essential for the production of explosives are discussed. Application of the theory of slow thermal transformation, combustion and detonation of explosives and the destructive effects of explosion are also considered.
AD-643 597 HC$3.00 MF$0.65

A LITERATURE SEARCH FOR CARTRIDGE CASE PLUG MATERIAL STUDIES,
Naval Ammunition Depot, Crane, Ind.
Alvin Smith. 8 Nov 66, 37p RDTR-61

Descriptors: (*Cartridge cases, Seals), (*Seals, Materials), Plastics, Expanded plastics, Foam rubber, Isocyanate plastics, Wood, Reviews.

A comprehensive literature search has been carried out to determine whether plastic materials have been used in cartridge case plugs for semi-fixed ammunition and if so, which materials were studied and the results of those studies. Several military activities were visited and numerous personal interviews conducted in an effort to collect all pertinent information associated with cartridge case plug work. A synopsis of findings is given and references are made to applicable documents. (Author)
AD-643 739 HC$3.00 MF$0.65

ESTABLISHMENT OF SAFETY DESIGN CRITERIA FOR USE IN ENGINEERING OF EXPLOSIVE FACILITIES AND OPERATIONS.
Picatinny Arsenal, Dover, N. J. Ammunition Engineering Directorate.
For primary bibliographic entry see Field 19D.
AD-643 871 HC$3.00 MF$0.65

DEVELOPMENT AND QUALIFICATION OF IGNITION ELEMENT, ELECTRICAL, XM47.
Technical rept., Nov 64-Mar 66,
Frankford Arsenal, Philadelphia, Pa.
Alonzo E. White. Oct 66, 41p FA-R-1827
SEG-TR-66-42

Descriptors: (*Electric igniters, Performance (Engineering)), Safety, Propellants, Explosive actuators, Firing circuits, Redundant components, Safety devices.
Identifiers: XM47 Ignition element.

This report covers the development and qualification testing of the XM47 electrical ignition element. The element has redundant firing circuits, is functional over the temperature range of -65 to 400 F, and will not fire when subjected to one ampere/one watt of electrical energy. Presented are the element design, qualification tests and data, and performance characteristics.
AD-643 950 HC$3.00 MF$0.65

19D. EXPLOSIONS, BALLISTICS, AND ARMOR

SHORT-PERIOD PROPAGATION OF INFRASONIC WAVES FROM NUCLEAR EXPLOSIONS,
RAND Corp., Santa Monica, Calif.
W. C. Meecham. Oct 66, 30p RM-5103-ARPA
Contract SD-79, ARPA Order-189-1

Descriptors: (*Nuclear explosions, Sound signals), (*Sound signals, Propagation), Time, Refraction, Climatology.
Identifiers: Infrasound.

A possible explanation is given for the great time duration of intermediate-period (about one minute) and short-period (less than one minute) acoustic-gravity waves received from nuclear explosions. It is suggested that the signal delay for intermediate periods may be due to refraction from large-scale weather fronts, and that the signal delay for short periods may be caused by commonly occurring wind ducts. (Author)
AD-643 536 HC$3.00 MF$0.65

FEASIBILITY OF LAUNCHING MICRON-SIZE PARTICLES AT SPEEDS OF 12,000 FT/SEC TO 18,000 FT/SEC.
Memorandum rept.,
Ballastic Research Labs., Aberdeen Proving Ground, Md.
Walter F. Braun. Sep 66, 38p BRL-MR-1780

Descriptors: (*Sabot projectiles, Launching), Particles, Stable isotopes, Light gas guns, Inhibition, Targets, Spark shadowgraph photography, Exterior ballistics, Feasibility studies.

A technique is described whereby a light gas gun was used to launch micron-size spherical particles of the stable isotope of a radioactive salt at velocities up to 18,000 ft/sec. The required sabot was successively retarded, deflected and stopped before reaching the range area. Spark shadowgraph and streak camera techniques were used to observe the particles in free flight. (Author)
AD-643 537 HC$3.00 MF$0.65

A STUDY OF THE BULK CAVITATION CAUSED BY UNDERWATER EXPLOSIONS.
Research and development rept.,
David Taylor Model Basin, Portsmouth, Va. Underwater Explosions Research Div.
R. R. Walker, and J. D. Gordon. Sep 66, 101p DTMB-1896

Descriptors: (*Underwater explosions, *Cavitation), Surface properties, Mathematical models, Bubbles.

The detailed theoretical models of bulk cavitation and bulk cavitation data obtained from tests are used to develop simple calculations for predicting bulk cavitation phenomena. Several reasonable mathematical approximations describing these phenomena are derived. The mathematical treatments have, as a foundation, concepts derived in the theoretical study; however they are modified and simplified where experimental results indicate that such modifications and simplifications are justified. With these approximate mathematical models, estimations can be made of the boundaries, depths and durations of cavitation as well as the motion of the water surface for a wide variety of conditions without employing a computer. Other findings derived from the experimental test data are: (1) for the closer regions extending even beyond the ring of first impact, the bubble expansion causes the water below the closure depth to rise and thus causes closure to occur at a much earlier time, sine the layer does not have to fall to its original position; (2) when the draft of a floating structure is small compared to the thickness of the water layer, the bodily motions of that structure are essentially the same as the water layer, and these motions are relatively independent of the cross sectional shape of the structure; and (3) negative reflections from the bottom strong enough to produce cutoff are quite possible even with relatively large pressure amplitudes, and are capable of considerably modifying the region of cavitation. (Author)
AD-643 549 HC$3.00 MF$0.65

Group 19D—Explosions, ballistics, and armor

MULTIPOINT INITIATED IMPLOSIONS FROM HEMISPHERICAL SHELLS OF SHEET EXPLOSIVE.
Technical note.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
I. I. Glass, and J. E. Kennedy. Dec 66, 31p
UTIAS-TN-99
Contract AF 33(657)-7874
Prepared in cooperation with IIT Research Inst., Chicago, Ill.

Descriptors: (*Explosive materials, Explosion effects), Sheets, Hemispherical shells, Detonations, Shock waves, Stability, Canada, Launching.
Identifiers: Implosions.

Some preliminary results are given on the generation of implosion waves by simultaneously detonating a hemispherical shell of sheet explosive at 91 individual initiation sites. The 7 in. dia. x 0.168 in. thick shell was formed from eight 'orange-peel' segments cemented on a steel backing shell 0.1 in. thick, which was perforated to take the 91 detonators. A scalloped type shock wave surface was generated from the 91 individual detonation sites that imploded into the gas space. The distortions of the shock wave surface increased as the implosion wave gained in strength while converging on the origin. It would seem from the limited experiments that this may not be a useful way of producing implosions. However, it appears to be a useful method of investigating instabilities of implosion waves arising from controlled disturbances. (Author)
AD-643 669 HC$3.00 MF$0.65

ESTABLISHMENT OF SAFETY DESIGN CRITERIA FOR USE IN ENGINEERING OF EXPLOSIVE FACILITIES AND OPERATIONS.
Rept. no. 8, Jan-Dec 65 on Supporting Studies, Picatinny Arsenal, Dover, N. J. Ammunition Engineering Directorate.
Richard M. Rindner, Stanley Wachtell, and Leon W. Saffian. Dec 66, 201p
PA-TR-3484

Descriptors: (*Explosive materials, Storage), (*Reinforced concrete, Blast), Loading (Mechanics), Structures, Reinforcing materials, Pressure, Safety, Instrumentation, Weapons, Warheads.

This report presents a summary of activities from January-December 1965 on the supporting studies to establish a Safety Design Criteria Program under the technical management of Picatinny Arsenal. Work performed in these areas is described: A model scale slab test program (1/3 and 1/10 scale) to investigate the response of reinforced concrete to blast loads; a model scale bay test program to evaluate the explosive capacity of a bay structure and to establish the validity of scaling; a 1/3 scale modified C-13 cubicle test to demonstrate the use of new design and construction techniques; a full-scale test program to complete the investigation for compartmenting igloos for safe storage of small weapons, and development of new impulse curves in a cubicle type structure.
AD-643 871 HC$3.00 MF$0.65

DETERMINATION OF IGNITION CONDITIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 21B.
AD-643 952 HC$3.00 MF$0.65

GUNFIRE TESTING.
Harrisburg Steel Co., Pa.
For primary bibliographic entry see Field 13D.
AD-644 163 HC$3.00 MF$0.65

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20. PHYSICS

20A. ACOUSTICS

FERROACOUSTIC RESONANCE IN MAGNETIC MEDIA.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20C.
AD-643 600 HC$3.00 MF$0.65

COMPUTER PROGRAMS FOR TOWED ARRAY STABILITY ANALYSIS,
Naval Ordnance Lab., White Oak, Md.
D. Kennison. 30 Sep 66, 142p NOLTR-66-174, Mathematics Dept-M-66

Descriptors: (*Hydrophones, Towed bodies), (*Towed bodies, Stability), Programming (Computers), Towing cables, Motion, Mathematical analysis, Power, Correlation techniques.

The report describes four computer programs which were written to carry out an analysis of towed array data. Included are routines for power spectrum analysis, correlation analysis, and digital tape editing. (Author)
AD-643 752 HC$3.00 MF$0.65

ULTRASONIC AND HYPERSONIC STUDIES OF VIBRATIONAL RELAXATION IN BENZENE,
John Carroll Univ., Cleveland, Ohio. Dept. of Physics.
Joseph L. Hunter, E. F. Carome, Henry D. Dardy, and J. A. Bucaro. Aug 66, 7p
AROD-6285:1
Contract DA-31-124-ARO(D)-424
Availability: Published in The Journal of the Acoustical Society of America v40 n2 p313-6 Aug 1966.

Descriptors: (*Benzene, Acoustic properties), (*Ultrasonic radiation, Absorption), Chemical bonds, Vibration, Relaxation time, Velocity, Specific heat, Concentration (Chemistry).
Identifiers: Hypersonic radiation, Sonochemistry.

Ultrasonic absorption measurements were made in benzene over the frequency range from 7 to 570 Mc/sec at 6C and 25C. Velocity measurements at both ultrasonic and hypersonic frequencies also were made in the temperature range 6-60C. The observed relaxation effects may be interpreted in terms of double relaxation of the vibrational specific heat. Analysis of the absorption data indicates that the vibrational specific heat associated with all but the lowest vibrational mode relaxes in the ultrasonic range, with the measured relaxation frequency varying from 510 Mc/sec at 6C to 560 Mc/sec at 25C. Correlation of the ultrasonic and hypersonic data also indicates a second relaxation frequency (associated with the lowest vibrational mode) of the order of 10 Gc/sec. (Author)
AD-644 087 Not available from CFSTI.

20B. CRYSTALLOGRAPHY

THE FIELD ION MICROSCOPICAL IMAGE OF AN ORDERED PLATINUM-COBALT ALLOY.
Pennsylvania State Univ., University Park. Dept. of Physics.
For primary bibliographic entry see Field 20F.
AD-643 447 Not available from CFSTI.

SEPARATION OF PARTICLE SIZE AND LATTICE STRAIN IN INTEGRAL BREADTH MEASUREMENTS.
Technical rept.,
Yale Univ., New Haven, Conn. Hammond Lab.
N. C. Halder, and C. N. J. Wagner. 7 Jul 65, 5p
TR-14
Contract Nonr-609(43)
Revised ed.
Availability: Published in Acta Crystallographica v20 pt2 p312-3 Feb 1966.

Descriptors: (*Particle size, Crystallography), (*Crystal lattices, Strain (Mechanics)), X-ray diffraction analysis, Silver alloys, Indium alloys, Tungsten, Particles, Powder metals.

A new analytical method is described which allows the separation of particle size and lattice strain in integral measurements. The equation b (P)/b (s) = 1 - (b (D)/b (s)) squared is a very good approximation to the exact expression. b (D) and b (P) are the integral breadths due to strain and particle size and b (s) is the total breadth corrected for instrumental broadening. (Author)
AD-643 450 Not available from CFSTI.

EXPERIMENTAL CONFIRMATION OF MAJOR CHANGE OF DEFECT TYPE WITH TEMPERATURE AND COMPOSITION IN IONIC SOLIDS,
Pennsylvania State Univ., University Park. Materials Research Lab.
A. M. Diness, and Rustum Roy. 15 Mar 66, 4p
AFOSR-66-2150
Grant AF-AFOSR-208-63
Availability: Published in Solid State Communications v3 p123-5 1965.

Descriptors: (*Crystal lattice defects, Ceramic materials), Zirconium compounds, Oxides, Calcium compounds, Doping, Quenching (Cooling), High-temperature research, Density.

The change of predominant point defect-type from interstitial cations to anion vacancies is presented as a function of temperature and concentration for the fluorite-type crystalline solution field in the system ZrO2-CaO. The characterization of the point defect content of these materials is based upon experimental determinations of densities and precision X-ray lattice parameters. (Author)
AD-643 452 Not available from CFSTI.

CURRENT-VOLTAGE CHARACTERISTICS BY IMAGE PHOTOMETRY IN A FIELD ION MICROSCOPE.
Pennsylvania State Univ., University Park. Dept. of Physics.
For primary bibliographic entry see Field 20F.
AD-643 476 Not available from CFSTI.

IN-SITU MANIPULATION OF FIELD ION MICROSCOPE SPECIMENS.
Pennsylvania State Univ., University Park. Dept. of Physics.
For primary bibliographic entry see Field 20F.
AD-643 477 Not available from CFSTI.

F-CENTER FORMATION BY FUNDAMENTAL ABSORPTION IN KI.
Technical rept.,
Cornell Univ., Ithaca, N. Y. Materials Science Center.
F. T. Goldstein. Sep 66, 104p TR-8, MSC-545
Contract Nonr-401(47)
Doctoral thesis.

Descriptors: (*Color centers, Halides), (*Potassium compounds, Iodides), Ultraviolet radiation, Absorption, Luminescence, Monochromatic light, Crystal lattice defects, Band spectrum.
Identifiers: Potassium iodide.

The experimental techniques employed in this work consisted of irradiating a KI crystal with ultraviolet and, in some cases, additional visible light. This irradiation resulted in the growth of color centers which were studied by measuring

the growth of the absorption bands associated with the centers. The effect of bleaching on the growth was studied and in addition, various luminescence measurements were performed.
AD-643 486 HC$3.00 MF$0.65

ANOMALOUS STRESS EFFECTS IN RESONANT-MODE INFRARED ABSORPTION.
Interim rept.,
Milan Univ. (Italy). Istituto di Fisica.
G. Benedek, and G. F. Nardelli. 28 Jan 66, 4p
AFOSR-66-2129
Grant AF-EOAR-5-65
Availability: Published in Physical Review Letters v16 n12 p517-9 Mar 21 1966.

Descriptors: (*Stresses, *Absorption (Physical)), Resonant frequency, Resonance absorption, Hydrostatic pressure, Crystal lattice defects, Infrared research.

The paper reports on the anomalous behavior that the resonant-mode infrared absorption exhibits under the application of uniaxial or hydrostatic stress. The main feature of the effect consists in the large shift that the peak frequency suffers under the application of the stress. Indeed this shift is predicted to be in some cases 20 times larger than the shift suffered by the host lattice frequencies. (Author)
AD-643 517 Not available from CFSTI.

ENERGY STRUCTURE OF ALUMINUM ANTIMONIDE ZONES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. V. Sobolev. 21 Nov 66, 8p FTD-HT-66-490
TT-67-60192
Unedited rough draft trans. of Zhurnal Prikladnoi Spektroskopii (USSR) v3 n4 p372-4 1965.

Descriptors: (*Aluminum alloys, Antimony alloys), (*Band theory of solids, Aluminum alloys), Band spectrum, Crystal structure, Absorption, Crystals.
Identifiers: Aluminum antimonide.

Four bands are found in the reflection spectrum of aluminum antimonide at a temperature of 25C in the 1-6 ev region. The origin of the bands is explained on the basis of a diagram of direct allowed interzonal transitions at certain points. (Author)
AD-643 624 HC$3.00 MF$0.65

UKRAINIAN JOURNAL OF PHYSICS, VOL. 10, NO. 6: SELECTED ARTICLES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20L.
AD-643 638 HC$3.00 MF$0.65

THE OXIDATION OF COPPER SINGLE CRYSTALS. I. THE EARLY STAGES OF THE LOW PRESSURE OXIDATION PROCESS. II. EPITAXY.
Virginia Univ., Charlottesville. Dept. of Materials Science.
For primary bibliographic entry see Field 11F.
AD-643 677 Not available from CFSTI.

GROWTH AND STRUCTURE OF ELECTRODEPOSITED THIN METAL FILMS.
Virginia Univ., Charlottsville. Dept. of Materials Science.
For primary bibliographic entry see Field 11F.
AD-643 688 Not available from CFSTI.

A TRANSMISSION ELECTRON MICROSCOPY AND DIFFRACTION STUDY OF THE OXIDATION OF SINGLE CRYSTAL NICKEL FILMS.
Virginia Univ., Charlottesville. Dept. of Materials Science.
For primary bibliographic entry see Field 11F.
AD-643 747 Not available from CFSTI.

MICROWAVE PROPERTIES OF MANGANESE SUBSTITUTED Zn2Y SINGLE CRYSTALS AS A FUNCTION OF TEMPERATURE.
Army Electronics Command, Fort Monmouth, N. J.
For primary bibliographic entry see Field 11G.
AD-643 753 HC$3.00 MF$0.65

THE RECRYSTALLIZATION KINETICS AND ELECTRON MICROSCOPY OF MAGNESIUM AND CHROMIUM.
Final scientific rept. Oct 64-Oct 66.
Utah Univ., Salt Lake City. Dept. of Metallurgy.
Charles H. Pitt, Charles R. Brinkman, Ernest L. Moore, Theron G. Odekirk, and William J. Hong.
Oct 66, 156p TR-2
AFOSR-66-2838
Grant AF-AFOSR-39-65

Descriptors: (*Magnesium, Recrystallization), (*Chromium, Recrystallization), Electron microscopy, Grain size, Grain boundaries, Deformation, Nucleation, Temperature, Crystal lattice defects, Heat of activation.

The effect if grain size and degree of deformation on the recrystallization temperature of pure magnesium was determined. The effects of the alloying elements Mn, Fe, Co, Ni, Zn and Cd in amounts ranging from .005 to .02 atomic per cent recrystallization temperature and kinetics were determined. It was found that the effect on recrystallization temperature of solute additions was not a function of their atomic size or electronic structure but seemed to be related to the distribution coefficient of the solute. The recrystallization kinetics were determined for pure chromium and electron microscopic studies made of dislocation structures during various stages of recovery and recrystallization. The activation energy for recrystallization was found to be the same as the activation energy for self-diffusion in chromium. Finally grain growth measurements have been made for pure magnesium which indicates that secondary recrystallization invariably follows primary recrystallization. The activation energy for grain growth was found to be about one-half the activation energy for magnesium self-diffusion which indicates that the growth process is controlled by atomic migration across the boundary. Equations are given which fit the kinetic process observed in recrystallization and grain growth.
AD-643 764 HC$3.00 MF$0.65

DEVICE PERFORMANCE CHARACTERISTICS AS RELATED TO RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Final rept., Jun 65-Jun 66,
Nortronics, Newbury Park, Calif. Applied Research Dept.
George C. Messenger, Donavon D. Pretzer, William W. Chang, Stewart G. Kimble, and Edward J. Steele. Jun 66, 236p ARD-66-42-R
AFCRL-66-462
Contract AF 19 (628)-5113

Descriptors: (*Radiation damage, Semiconductors), (*Semiconductors, Materials), Semiconductor devices, Silicon, Germanium, Transistors, Diodes (Semiconductor), Integrated circuits, Fast neutrons, Sensitivity.

Radiation damage to bulk semiconductor materials and semiconductor devices has been investigated. Though the space radiation environment has been discussed, primary emphasis has been placed on the nuclear radiation environment since more experimental work has been done in the latter field. The Hall-Shockley-Read equations for describing minority carrier lifetime as a function of a single recombination level has been modified to account for the presence of two recombination levels. The resulting equations are in reasonably good agreement with the experimental work of O.L. Curtis on neutron damage to bulk silicon. The latest experimental work on radiation damage to bipolar transistors, semiconductor diodes, field effect transistors, and integrated circuits has been reviewed. Suggestions are included for establishing the minimum number of experimental and theoretical programs necessary to obtain the information required to eventually produce semiconductor devices which are relatively insensitive to the known radiation environments.
AD-643 783 HC$3.00 MF$0.65

ELASTIC SPECTRA OF TWO-DIMENSIONAL DISORDERED LATTICES. II. IMPURITIES WHICH ALTER THE INTERACTIONS.
Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.
For primary bibliographic entry see Field 20L.
AD-643 866 HC$3.00 MF$0.65

THE EFFECT OF PRELIMINARY RECOVERY ON THE RECRYSTALLIZATION KINETICS OF DEFORMED METALS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. N. Larikov, O. E. Zasimchuk, and Zh. Ya. Kutikhina. 5 Oct 66, 11p FTD-HT-66-179
TT-67-60281
Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR), v10 n8 p899-05 1965.

Descriptors: (*Metals, *Recrystallization), USSR, Annealing, Microstructure, Single crystals, Copper, Nickel, Niobium, Tungsten, Molybdenum, Deformation, Dynamics.

X-ray and microstructural methods were used to study the effect of preliminary annealing on subsequent recrystallization in single crystals of a number of pure metals (Cu, Ni, Nb, W, Mo). After weak deformations preliminary recovery of the samples leads to a delay and, sometimes, even to complete prevention of subsequent recrystallization. Single crystals of metals with body-centred lattices may be deformed by 30% and more without recrystallization during subsequent annealing, provided there is a definite geometry of plastic deformation. The effect of inhibition of recrystallization by preliminary annealing was observed earlier by Semell and Machlin on studying a weakly bent silver single crystal, and they connected it with the vanishing of excess vacancies during preliminary annealing. It is shown in this paper that in the investigated metals preliminary annealing inhibits subsequent recrystallization owing to polygonization rather than to vacancy rest. After strong (80%) deformations preliminary polygonization did not affect the subsequent course of recrystallization. (Author)
AD-643 925 HC$3.00 MF$0.65

COMPUTER INVESTIGATION OF RADIATION DAMAGE IN CRYSTALS.
Final rept., Jun 65-Aug 66,
Atomics International, Canoga Park, Calif.
Allan Anderman. Sep 66, 100p AI-66-252
AFCRL-66-688
Contract AF 19 (628)-5120

Descriptors: (*Metallic crystals, Radiation damage), (*Radiation damage, Crystal structure), Crystal lattice defects, Symmetry (Crystallography), Computer programs, Crystal lattices, Relaxation time, Copper, Aluminum, Gold, Single crystals, Stability, Diffusion.

A theoretical study of radiation damage in crystals has been performed, using computer techniques. The materials studied were three face-centered cubic metals: copper, aluminum and gold. Two major areas of investigation were pursued: (1) the study of various static configurations of lattice defects in copper and aluminum; and (2) the study of threshold displacement energies in gold. The major focus of all work done was the effect of the

choice of interatomic potential on the calculational results obtained. It is shown that the magnitude of the interstitial defect energies calculated is highly sensitive to the detailed form of the potential employed. With respect to vacancy characteristics, a potential for copper has been developed which leads to excellent agreement with experiment. In addition, a procedure is indicated for modifying this potential to also give meaningful results for interstitial characteristics. Of four Born-Mayer potentials studied for gold, it is shown that only the one derived on the basis of radiation damage data leads to good agreement with experiment for the (100) threshold energy. Threshold studies in the (110) direction indicated highly efficient propagation of energy along the collision line. However, it is concluded that no reasonable judgment concerning the (110) threshold energy can be made from the data obtained.
AD-643 956 HC$3.00 MF$0.65

EFFECT OF TITANIUM, ALUMINUM, CARBON, AND BORON ON THE STRUCTURE AND PHASE COMPOSITION OF A NICKEL BASE ALLOY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11F.
AD-643 968 HC$3.00 MF$0.65

CRYSTAL STRUCTURE OF DIBENZOYLFERROCENE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7C.
AD-643 994 HC$3.00 MF$0.65

PRINCIPLE OF THE DYNAMIC X-RAY DIFFRACTION TECHNIQUE.
Massachusetts Univ., Amherst. Polymer Research Inst.
For primary bibliographic entry see Field 14B.
AD-644 029 HC$3.00 MF$0.65

EFFECTS OF ORIENTATION AND CARBON ON THE MECHANICAL PROPERTIES OF IRON SINGLE CRYSTALS,
General Electric Research Lab., Schenectady, N. Y.
For primary bibliographic entry see Field 11F.
AD-644 080 Not available from CFSTI.

INDIRECT OPTICAL ABSORPTION OF AgCl-AgBr ALLOYS,
Illinois Univ., Urbana. Dept. of Physics.
For primary bibliographic entry see Field 20L.
AD-644 093 Not available from CFSTI.

A THEORY OF THE MECHANICAL PROPERTIES OF SPHERULITES.
Technical rept.,
Massachusetts Univ., Amherst. Polymer Research Inst.
T. Kawaguchi, and Richard S. Stein. Apr 66, 36p
ONR-TR-88, ARO-ITR-3
Contract Nonr-3357 (01), Grant DA-ARO (D)-31-124-G469
See also AD-644 105.

Descriptors: (*Polymers, Mechanical properties), Spheres, Crystals, Theory, Elasticity, Laminates.
Identifiers: Spherulites.

The mechanical properties of spherulites are calculated from the mechanical properties of the constituent structure which is assumed to be composed of crystalline lamella with transverse isotropy interspersed with isotropic amorphous regions. Using continuum elasticity theory, the mechanical properties of a polymer consisting of an aggregate of such spherulites is calculated from the elastic constants of the crystalline and amorphous regions. (Author)
AD-644 098 HC$3.00 MF$0.65

THE MECHANICS OF SPHERULITE DEFORMATION.
Technical rept.,
Massachusetts Univ., Amherst. Polymer Research Inst.
Rena Yang. Aug 66, 37p
ONR-TR-87, ARO-ITR-2
Contract Nonr-3357 (01), Grant DA-ARO (D)-31-124-G469

Descriptors: (*Polymers, Deformation), Crystals, Spheres, Disks, Mechanics, Strain (Mechanics), Birefringence, Crystal structure, Thickness, Anisotropy.
Identifiers: Spherulites.

The deformation of both tetragonal (fresh film) and hexagonal (aged film) modifications of polybutene-1 spherulites have been studied. The deformations were introduced by uniaxial stretching. The local birefringence of different regions of individual spherulites has been found to be different and its change with strain also varies between the crystalline modifications. Morphological changes with strain are illustrated by microphotographs. The rotation of the maltese extinction cross toward the stretching direction can be accounted for by the rotation of the optic axis toward the stretching direction. Void formation is very pronounced in the hexagonal modification and negligable in that of the tetragonal. Model calculations of birefringences give results agreeing with the experimental values. Finally, the affine deformation behavior was investigated by photographically measuring the changes in spherulitic areas. The changes in shapes of deformed spherulites are shown by interference microscopy and microscopy using polarized light on cross-sections obtained by microtoming. The affine deformation theory has been found to be valid only in low degrees of deformation. (Author)
AD-644 099 HC$3.00 MF$0.65

THE SCATTERING OF LIGHT BY DEFORMED THREE-DIMENSIONAL SPHERULITES.
Massachusetts Univ. Amherst. Polymer Research Inst.
For primary bibliographic entry see Field 20F.
AD-644 105 HC$3.00 MF$0.65

OR TEP A FORTRAN THERMAL-ELLIPSOID PLOT PROGRAM FOR CRYSTAL STRUCTURE ILLUSTRATIONS,
Oak Ridge National Lab., Tenn.
Carroll K. Johnson. Jun 65, 166p
Contract W-7405-eng-26

Descriptors: (*Crystal structure, Programming (Computers)), (*Programming (Computers), Crystallography).

For abstract, see NSA 20 24.
ORNL-3794 HC$3.00 MF$0.65

20C. ELECTRICITY AND MAGNETISM

EFFECT OF WATER VAPOR ON DIELECTRIC LOSS IN MgO.
Technical rept.,
Utah Univ., Salt Lake City. Dept. of Ceramic Engineering.
Howard B. Johnson, Owen W. Johnson, and Ivan B. Cutler. 4 Mar 66, 6p TR-2
Contract Nonr-1288 (06)
Revision of manuscript submitted 1 Oct 65.
Availability: Published in Journal of the American Ceramic Society v49 n7 p390 4 Jul 1966.

Descriptors: (*Dielectric properties, Magnesium compounds), (*Magnesium compounds, Oxides), Water vapor, Conductivity, Surface properties, Absorption (Physical).
Identifiers: Magnesium oxide.

A dielectric loss study of porous MgO indicates that H2O absorption on MgO probably leads to the formation of surface defects as well as hydroxide ions. The ac conductivity, sigma sub ac, followed the equation sigma sub ac=sigma sub 1 + KP sub H2O to the 0.27 power from 550 to 800 C when the water partial pressure was varied between 0.000007 and 0.03 atm. (Author)
AD-643 464 Not available from CFSTI.

DIPOLE RELAXATION IN CaF2 DOPED WITH NaF.
Technical rept.,
Utah Univ., Salt Lake City. Dept. of Ceramic Engineering.
Howard B. Johnson, Neal J. Tolar, G. R. Miller, and Ivan B. Cutler. 4 Mar 66, 2p TR-3
Contract Nonr-1288 (06)
Availability: Published in Journal of the American Ceramic Society v49 n8 p458 Aug 1966.

Descriptors: (*Relaxation time, Calcium compounds), (*Calcium compounds, Fluorides), Dielectric properties, Ceramic materials, Doping, Sodium compounds, Heat of activation, Conductivity.
Identifiers: Calcium fluoride.

A previously unreported loss peak in polycrystalline CaF2 was observed by both dielectric loss and internal friction methods. Earlier investigators reported that O (--) and Al (3+) can each form different impurity vacancy pairs which cause Debye-type losses in CaF2. In this study the addition of sodium fluoride to CaF2 caused a loss peak at higher frequencies, for the same temperature, than other loss peaks reported.
AD-643 465 Not available from CFSTI.

THERMOELECTRIC AND ELECTRICAL MEASUREMENTS IN THE ERBIUM-TELLURIUM SYSTEM.
Texas Univ., Austin. Dept. of Chemical Engineering.
For primary bibliographic entry see Field 11F.
AD-643 467 Not available from CFSTI.

EFFECT OF SPIN-ORBIT SCATTERING ON THE UPPER CRITICAL FIELD OF HIGH-FIELD SUPERCONDUCTORS,
Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.
L. J. Neuringer, and Y. Shapira. 31 May 66, 6p
AFOSR-66-2091
Contract AF 49 (638)-1468
Availability: Published in Physical Review Letters v17 n2 p81-4 Jul 11 1966.

Descriptors: (*Superconductors, Paramagnetic materials), Band theory of solids, Titanium alloys, Magnetic fields, Magnetic properties, Cryogenics, Vanadium alloys, Niobium alloys, Tantalum alloys.

Measurements of the temperature variation of H sub c2 for three concentrated titanium alloys, viz. Ti.42 V.58, Ti.56 Nb.44, T.48 Ta52, show upper critical fields substantially higher than those predicted by Maki's theory for the effects of Pauli spin paramagnetism. The observed deviation of the data from Maki's predictions show a systematic trend, namely the higher the atomic number (Z) of the column-V constituent (V (23) yields Nb (41) yields Ta (73)), the greater is the deviation. This trend is the first evidence to support the recent theoretical hypotheses that spin-orbit scattering counteracts the effect of Pauli spin paramagnetism on H sub c2. Values of the spin-orbit scattering times, deduced from the data using the theory of

Werthamer, Helfand and Hohenberg are found to decrease rapidly with increasing Z, as expected, and are also in order of magnitude agreement with theoretical estimates. (Author)
AD-643 547 Not available from CFSTI.

FERROMAGNETISM IN DILUTE ALLOYS.
Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.
Duk-Joo Kim. 24 Mar 66, 7p
AFOSR-66-2681
Contract AF 49 (638)-1468
Availability: Published in Physical Review v149 n2 p434-9 Sep 16 1966.

Descriptors: (*Ferromagnetism, Alloys), Palladium alloys, Iron alloys, Magnetic properties, Magnetic resonance, Electrons, Spin.

An interaction between conduction electrons is obtained by eliminating the exchange interaction between conduction electrons and localized spins in metals by means of a canonical transformation. This procedure of elimination is similar to that used in obtaining the electron-electron interaction due to phonons in the theory of superconductivity. The derived electron-electron interaction, however, is an exchange type and of repulsive nature, contrary to the case of electron-phonon interaction. As an illustrative application of the above result we calculate the paramagnetic susceptibility of conduction electrons. The susceptibility is increased when we include this new effective exchange interaction which adds to the enhancement caused by the Coulomb interaction. With this simple fact some of the interesting problems in dilute alloys are explained. The ferromagnetism of Pd alloys containing only 0.1 at. % of Fe, for example is attributed to that of conduction electrons which is made possible by the electron-electron interaction which acts additively with the Coulomb interaction. (Author)
AD-643 551 Not available from CFSTI.

COMPLEX SUSCEPTIBILITY OF TYPE II SUPERCONDUCTORS IN SWEPT FIELDS.
Interim rept.,
Massachusetts Inst. of Tech., Cambridge. National Magnetic Lab.
B. B. Schwartz, and E. Maxwell. 1 Jun 66, 3p JP-202
AFOSR-66-2682
Contract AF 49 (638)-1468
Availability: Published in Physics Letters v22 n1 p46-7 Jul 15 1966.

Descriptors: (*Superconductors, Magnetic properties), Alternating current, Equations, Theory.

An equation is derived for the complex a.c. susceptibility for a type II superconductor in the presence of a swept field. The result compares favorably with experiment. (Author)
AD-643 552 Not available from CFSTI.

PHOTOELECTRIC EFFECTS IN THE SILVER HALIDES.
Technical rept.,
Cornell Univ., Ithaca, N. Y.
C. W. Peterson. 11 Mar 66, 16p TR-10
Contract Nonr-401 (47)
Availability: Published in The Physical Review v148 p335-49 Aug 5 1966.

Descriptors: (*Silver compounds, Halides), (*Photoelectric effect, Silver compounds), Measurement, Chlorides, Doping, Band theory of solids.
Identifiers: Silver chloride.

Measurements have been made of quantum yield for external photoemission from pure and doped silver halides and from samples with various surface preparations. Energy distribution curves for external photoelectrons were simultaneously determined. The quantum yield for external photoemission was found to rise smoothly from a threshold of about 6.2 eV to a yield of about 0.1 electrons per incident photon near 11-eV incident energy for pure AgCl. The bulk of external photoelectrons were found to emerge with a uniform distribution in energy between 0 and 2 eV for all incident energies (in contrast to alkali-halide results) with the exception of a small tail which moves in proportion to increasing incident energy. Only a slight indication of the onset of band-to-band scattering was found. Models to account for these results in terms of multiple electron-electron scattering, nonvertical transitions, and the contribution of the second valence band are discussed in light of the recent theoretical band scheme for the silver halides. Surface treatment and dopings of Cu (+) and Ni (+) (significant in terms of photographic and photoconductive effects) were found to have little effect on intrinsic photoelectric properties of AgCl. (Author)
AD-643 553 Not available from CFSTI.

A RELATION INVOLVING HANKEL TRANSFORMS WITH APPLICATIONS TO BOUNDARY VALUE PROBLEMS IN POTENTIAL THEORY.
North Carolina State Univ., Raleigh. Applied Mathematics Research Group.
For primary bibliographic entry see Field 12A.
AD-643 563 Not available from CFSTI.

FERROACOUSTIC RESONANCE IN MAGNETIC MEDIA.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
M. A. Savchenko, V. V. Hann, and P. V. Ryabko. 7 Dec 66, 19p FTD-HT-66-217
TT-67-60189
Edited trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v10 n3 p263-74 1965.

Descriptors: (*Ferromagnetism, Resonance), (*Acoustics, Ferromagnetism), Ferromagnetic materials, Magnetic fields, Antiferromagnetism, Magnetic moments, Hamiltonian, USSR.

Ferroacoustic resonance in ferromagnets and antiferromagnets is studied with an allowance for the boundary. The resonance amplitudes were determined from magnetic (spin) waves excited by an external acoustic field. The coefficients of absorption of magnetoacoustic vibrations at resonance were also determined. The excitment of magnetic (spin) waves by an external acoustic field at the boundary is considered and the general boundary conditions depending on the exchange forces, the surface-anisotropy field and surface magnetestriction were determined. It is shown that in antiferromagnets where magnetic moments are at an angle with respect to a strong magnetic field H, the magnetic moments of the sublattices gradually collapse near the boundary. In this case the distortion depth of the magnetic structure is equal to a multiple of the lattice constant. In the approximation of weak surface antsotropy the resonance amplitudes of spin waves excited by an external acoustic field and the absorption coefficients of coupled vibrations at resonance are determined. (Author)
AD-643 600 HC$3.00 MF$0.65

NONLINEAR SPACE CHARGE WAVE THEORY OF THE HYDRODYNAMIC DISC-ELECTRON BEAM.
Technical note,
Chalmers Univ. of Technology, Goteborg (Sweden). Research Lab. of Electronics.
S. Olving, and S. Wallander. 1 Nov 64, 43p TN-4, RR-42
RADC-TR-66-779
Contract AF 61 (052)-594

Descriptors: (*Electron beams, *Space charges), Microwave equipment, Nonlinear systems, Propagation, Turbulence, Fluid dynamic properties, Theory, Sweden, Electronics.

The report deals with a simple, idealized, radially finite electron beam model which to our knowledge has not been treated in the literature before. The beam is assumed to be composed of infinitesimal discs whose charge to mass ratio equals that of the electron. The diameter of the plane, rigid discs equals that of the real confined beam. The propagation of high frequency disturbances (generated in an ideal, gridded velocity modulation gap) along the disc-electron beam is studied analytically. It is shown that the disturbances, i.e. space charge waves, in the disc-electron beam are practically equivalent to those in the corresponding real confined beam. However, the theory for the new model is comparatively simple which is the motivation for its use. The report contains a fourth order nonlinear analysis of the space charge waves on a disc-electron beam propagating in a conducting tunnel. (Author)
AD-643 660 HC$3.00 MF$0.65

A NEAR-FIELD SOLUTION FOR AN INFINITE LINE SOURCE ABOVE A DIELECTRIC COATED CONDUCTING PLANE.
Technical rept.,
Illinois Univ., Urbana. Antenna Lab.
G. F. Van Blaricum, and R. Mittra. Aug 66, 43p 66-13, TR-10
AFCRL-66-700
Contracts AF 19 (628)-3819, NSG-395

Descriptors: (*Electromagnetism, Field theory), Dielectrics, Antennas, Radio transmission, Integral transforms, Complex variables.

The fields along a dielectric slab excited by a line source are found by considering the inversion integral of a Fourier transform directly rather than by resorting to the usual saddle point approximation techniques. The field at any point along the surface is expressed as a superposition of traveling waves plus a spacewave contribution, and conditions under which the field may be approximated by traveling wave components alone are discussed. Results of sample computations for both electric and magnetic current excitation are given. (Author)
AD-643 773 HC$3.00 MF$0.65

SUPERCONDUCTIVITY IN ONE AND TWO DIMENSIONS, II CHARGED SYSTEMS.
Technical rept.,
California Univ., San Diego, La Jolla. Dept. of Physics.
T. M. Rice. 9 Aug 66, 44p TR-41
Contract Nonr-2216 (11), Grant AF-AFOSR-610-64
See also AD-618 203, AD-639 480.

Descriptors: (*Superconductivity, Thermodynamics), (*Charged particles, Superconductivity), Energy, Statistical functions, Theory, Superconductors.

In an earlier paper the Ginzburg-Landau free energy functional was used to calculate the effect of thermodynamic fluctuations on the off-diagonal correlation function and no off-diagonal long-range order was found in one- and two-dimensional systems. It has been pointed out that for a charged system the use of the Ginzburg-Landau free energy flunctional is in error for arbitrary non-equilibrium values of the order parameter since the electrostatic energy of the charge fluctuations associated with an arbitrary order parameter is not included in the free energy functional. A direct generalization of the free energy functional was not achieved. It was found that for uncharged systems the RPA gives a linearization of the results obtained earlier using the Ginzburg-Landau theory. For charged systems the RPA results were similar to those obtained for uncharged systems. It was concluded that it is very likely that, as in uncharged systems, there will be no ODLRO in charged infinite one- and two-dimensional systems. (Author)
AD-643 781 HC$3.00 MF$0.65

PENETRATION OF THE ELECTROMAGNETIC FIELD IN MOVING CONDUCTORS,
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
For primary bibliographic entry see Field 20I.
AD-643 788 HC$3.00 MF$0.65

THE PRELIMINARY STUDY OF THE MAGNETIC FIELD ASSOCIATED WITH CIRCULAR COILS,
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
Peter Kramarenko. 9 Jun 60, 6p Memo-15, PIB-MRI-832-60
Contract AF 30 (602)-2149

Descriptors: (*Coils, Magnetic fields), Intensity, Graphics, Functions.

Although this work does not yield a complete mapping of the field distribution associated with the assumed model certain conclusions can be drawn from the general trends put in evidence by this study: (1) The field intensity within the coil exhibits two main influences, one due to the proximity of the adjacent loops (near field) and the other due to the collective action of all other loops. An example of the above statement would be the field intensity along the axis. The periodic structure of the current distribution would be reflected in the periodic variation of the intensity with gradual decrease in amplitude as the end of the coil is approached. (2) The surface absolute value of H = 0 exists within or around the coil in cylindrical fashion with the effect of a discrete current distribution reflected in local protuberances. (Author)
AD-643 789 HC$3.00 MF$0.65

ENERGY STORAGE AND ENERGY CONVERSION THROUGH HIGH MAGNETIC FIELDS FROM SUPERCONDUCTORS,
Army Electronics Command, Fort Monmouth, N. J.
For primary bibliographic entry see Field 10A.
AD-643 791 Not available from CFSTI.

THEORY OF ELECTRON TRANSPORT PROCESSES IN TUNNEL DIODES.
Illinois Univ., Urbana. Dept. of Computer Science.
For primary bibliographic entry see Field 20L.
AD-643 825 HC$3.00 MF$0.65

SCESSIONS OF THE SECTION ON GENERAL AND APPLIED PHYSICS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. V. Karlov. 27 Sep 66, 6p FTD-HT-66-458
TT-67-60232
Unedited rough draft trans. of Akademiya Nauk SSSR. Vestnik, v35 n8 p82-4 1965.

Descriptors: (*Physics, Symposia), Field theory, Lasers, USSR.
Identifiers: Quantum electronics.

The article describes a group of reports given on quantum electronics and the results and prospectives of the work conducted at the Oscillation Laboratory of the Physics Institute is analyzed.
AD-643 875 HC$3.00 MF$0.65

THE BOGOLIUBOV EQUATIONS AND THEIR APPLICATION TO A NORMAL-SUPERCONDUCTING BOUNDARY.
Doctoral thesis,
Illinois Univ., Urbana.
Wesley Northey Mathews, Jr. 1966, 212p
AROD-431:79
Contract DA-31-124-ARO (D)-114

Descriptors: (*Superconductors, Equations), Potential theory, Electrons, Interactions, Excitation, Temperature, Wave functions, Field theory.
Identifiers: Bogoliubov equations.

The Bogoliubov equations are used to investigate the pair potential and the electronic excitations associated with a normal-superconducting boundary in an extreme type I superconductor. (Author)
AD-644 028 HC$3.00 MF$0.65

SPIN DEVIATION PROBABILITIES IN ORDERED MAGNETIC MATERIALS.
Technical rept.,
Pennsylvania Univ., Philadelphia. Dept. of Physics.
Herbert Callen. Nov 66, 6p TR-31
Contract Nonr-551 (36)

Descriptors: (*Magnetic materials, Nuclear spins), (*Antiferromagnetism, *Nuclear spins), Field theory, Statistical distributions, Green's function, Thermodynamics, Ferromagnetic materials.
Identifiers: Heisenberg ferromagnet.

It is shown that the probability distribution for spin deviations is exponential in many models of magnetic materials. (Author)
AD-644 076 HC$3.00 MF$0.65

ANTIFERROMAGNETICALLY COUPLED SPIN IMPURITIES IN FERROMAGNETS.
Technical rept.,
Pennsylvania Univ., Philadelphia. Dept. of Physics.
Herbert Callen, and Yung-Li Wang. Nov 66, 8p TR-32
Contract Nonr-551 (36)

Descriptors: (*Ferromagnetic materials, Nuclear spins), (*Antiferromagnetism, *Nuclear spins), Impurities, Field theory, Wave functions, Ground state, Green's function.
Identifiers: Heisenberg ferromagnet.

A rigorous theory is given of the ground state of an antiferromagnetically-coupled spin impurity (s = 1/2) in a ferromagnetic host (of arbitrary S). This is compared with the results of spin wave theory, providing some insight into the corresponding calculation for a pure antiferromagnet. (Author)
AD-644 077 HC$3.00 MF$0.65

IONIC THERMOCURRENTS IN DIELECTRICS,
Milan Univ. (Italy). Instituto Di Fisica.
Germano Guidi, Cesare Bucci, and Roberto Fieschi. 3 Feb 66, 10p
AFOSR-66-2708
Grant AF-EOAR-7-65
Prepared in cooperation with Parma Univ. (Italy), Instituto di Fisica, and Pennsylvania Univ., Philadelphia, Dept. of Physics.
Availability: Published in The Physical Review v148 n2 p816-23 Aug 12 1966.

Descriptors: (*Dielectrics, Ionic current), Alkali metal compounds, Halides, Dielectric properties, Thermal conductivity, Crystal lattice defects, Impurities, Heat of activation.

The ionic thermoconductivity (ITC) method, consisting of the study of the thermally activated release of dielectric polarization, is studied in great detail in alkali halide crystals. The (divalent metal ion, cation vacancy) dipoles give rise to an ITC band below OC, whose area is proportional to the polarizing field. The activation energy for dipole orientation can be obtained with an accuracy of 0.1%, when there are no overlapping bands. It is shown that the sensitivity of the ITC in detecting small contributions to the polarization (down to 2X10 to the 15th power dipoles per sq cm) or in separating overlapping relaxation processes is greater than that of methods presently employed. The solubility of the impurities can be studied by measuring the ITC of samples subjected to annealing at a fixed temperature. Intense ITC bands appearing in KCl between 280 and 430K are probably due to contact effects. Measurements on other substances such as quartz, calcite, and Teflon show that by means of a single ITC measurement one obtains a complete qualitative picture of the polarization in a dielectric. (Author)
AD-644 079 Not available from CFSTI.

'CURRENT-STRICTION' - A MECHANISM OF ELECTROSTRICTION IN MANY-VALLEY SEMICONDUCTORS.
Pennsylvania Univ., Philadelphia.
For primary bibliographic entry see Field 20L.
AD-644 097 HC$3.00 MF$0.65

CONJUGACY TO UNITARY GROUPS WITHIN THE INFINITE-DIMENSIONAL SYMPLECTIC GROUP,
Argonne National Lab., Ill.
For primary bibliographic entry see Field 12A.
For abstract, see NSA 20 24.
ANL-7216 HC$3.00 MF$0.65

20D. FLUID MECHANICS

STABILITY OF A TANGENTIAL DISCONTINUITY IN AN INCOMPRESSIBLE CONDUCTING FLUID,
Massachusetts Inst. of Tech., Cambridge. Dept. of Mathematics.
Leonard Todd. 15 Nov 65, 3p
AFOSR-66-1900
Grant AF-AFOSR-335-63
Availability: Published in The Physics of Fluids v9 n4 p814-5 Apr 1966.

Descriptors: (*Incompressible flow, Stability), Fluids, Conductivity.

A simple physical prescription is given for the stability criterion on the tangential discontinuity in an incompressible conducting fluid. (Author)
AD-643 473 Not available from CFSTI.

AERODYNAMIC PROPERTIES OF SOME SIMPLE BODIES IN THE HYPERSONIC TRANSITION REGIME.
Revised ed.,
Sydney Univ. (Australia). Dept. of Aeronautical Engineering.
G. A. Bird. 30 Aug 65, 8p
AFOSR-66-2551
Grant AF-EOAR-64-65
Revision of manual submitted 10 May 65..
Availability: Published in AIAA Journal v4 n1 p55-60 Jan 1966.

Descriptors: (*Cylindrical bodies, Hypersonic characteristics), (*Spheres, Hypersonic characteristics), (*Flat plate models, Hypersonic characteristics), Drag, Heat transfer, Flow fields, Monte Carlo method, Leading edge, Boundary layer, Molecules, Shear stresses, Australia.

A Monte Carlo simulation technique was used to conduct numerical experiments with a model gas on a digital computer. Drag, heat transfer, and general flowfield information was obtained for cylinders, spheres, and zero incidence flat plates. Speed ratios of 5 and 10 were treated, while the Knudsen number ranged from 0.1 to 30. It was found that drag coefficient results give a poor indication of the onset of collisional effects, since the fall in the streamwise momentum of the molecules striking the body is initially compensated by an increase in the flux of these molecules. For cylinders and spheres with cold surfaces, the drop in momentum may be overcompensated, and the drag coefficient may rise above the free molecule value before falling, with Knudsen number, towards the continuum value. The shear stress on a flat plate was found

to rise above the free molecule value for both hot and cold surfaces. Some results were obtained for the pressure distribution on finite length flat plates, and these indicate that, contrary to a common assumption, there is no free moleculeregion at the leading edge of such plates. (Author)
AD-643 478 Not available from CFSTI.

SHOCK-WAVE STRUCTURE IN A RIGID SPHERE GAS,
Manchester Univ. (England). Dept. of Mechanics of Fluids.
G. A. Bird. 1965, 10p
AFOSR-66-2063
Grant AF-EOAR-64-65
Availability: Published in Rarefied Gas Dynamics v1 p216-22 1965.

Descriptors: (*Shock waves, Gases), Monte Carlo method, Molecular properties, Probability, Great Britain.

Consideration is given to a gas composed of rigid sphere molecules, initially in thermal equilibrium between two infinite, plane, parallel and specularly reflecting walls. A Monte Carlo approach is used to study the shock wave which is formed when one wall impulsively acquires a uniform velocity towards the other. The method essentially consists of carrying out a 'numerical experiment' with a model gas on a very fast computer. Shock wave density profiles are presented for shock Mach numbers from 1.5 to 30. These are compared with the profiles predicted by various analytical methods. (Author)
AD-643 479 Not available from CFSTI.

ON RIEMANN'S CRITERION FOR THE STABILITY OF LIQUID ELLIPSOIDS,
Chicago Univ., Ill. Dept. of Mathematics.
N. R. Lebovitz. 3 Mar 66, 11p
AFOSR-66-2774
Grant AF-AFOSR-712-65
Availability: Published in The Astrophysical Journal v145 n3 p878-85 Sep 1966.

Descriptors: (*Ellipsoids, Liquids), (*Liquids, Stability), Equations of motion, Energy, Perturbation theory, Partial differential equations.
Identifiers: Riemann's criterion.

The energy criterion used by Riemann to discuss the stability of the ellipsoids that now bear his name is shown to be incorrect except under special circumstances. These circumstances prevail in the problem of the stability of the Maclaurin spheroids, where Riemann's well-known criteria for the onset of instability has been amply verified. The incorrectness of the criteria in general explains the discrepancies between Riemann's stability results on the one hand, and Chandrasekhar's on the other. (Author)
AD-643 483 Not available from CFSTI.

A STUDY OF THE BULK CAVITATION CAUSED BY UNDERWATER EXPLOSIONS.
David Taylor Model Basin, Portsmouth, Va. Underwater Explosions Research Div.
For primary bibliographic entry see Field 19D.
AD-643 549 HC$3.00 MF$0.65

RAREFIED-FLOW TRANSITION AT A LEADING EDGE,
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
Y. S. Pan, and Ronald F. Probstein. 1966, 48p
Contract Nonr-1841 (93)
Availability: Published in Proceedings of International Symposium on Fundamental Phemomena in Hypersonic Flow 1966.

Descriptors: (*Superaerodynamics, Boundary layer transition), (*Boundary layer transition, Leading edge), Shock waves, Hypersonic flow, Flat plate models, Heat transfer, Reynolds number, Surface temperatures.

Rarefied flow near the leading edge of a flat plate is studied by using the Navier-Stokes equations as a model. By considering the structure of an oblique shock wave, new low-density jump conditions are obtained which include the effects of inviscid curvature, thickness, and transport behind the shock. The latter effect leads to the concept of a 'velocity slip' (and temperature jump) behind a shock, analogous to that prevailing at a solid surface in a low-density flow. The equations governing the viscous layer itself were formulated, including the effect of normal pressure gradient, and reduced to ordinary differential form on the basis of a hypersonic, thin-shock-layer analysis and a local-similarity type of approximation. At the plate surface the usual Maxwell slip effects were taken into account, while at the outer boundary of the viscous shock layer the new jump conditions were applied. One of the important results of the numerical calculations is that the local heat-transfer rate at low Reynolds number can be greater than the free-molecule value with a unit accommodation coefficient. (Author)
AD-643 576 Not available from CFSTI.

NOTE ON THE APPLICATION OF A MOMENT METHOD TO HEAT CONDUCTION IN RAREFIED GASES BETWEEN CONCENTRIC SPHERES.
Revised ed.,
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
George S. Springer, and Shoung Fun Wan. 28 Apr 66, 3p
Contract Nonr-1841 (93)
Revision of manuscript submitted 6 Dec 65.
Availability: Published in AIAA Journal v4 n8 p1441-3 Aug 1966.

Descriptors: (*Superaerodynamics, Thermal conductivity), Moments, Spheres, Boundary value problems, Heat transfnr.

Lees' analysis for heat conduction between concentric spheres is extended to include arbitrary accommodation coefficients at the surface of the inner sphere, and a comparison is made between the moment method solution and the temperature jump and free molecule solutions indicating the effects of geometry on the results. (Author)
AD-643 614 Not available from CFSTI.

NOZZLE DESIGN,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. M. Yurev. 14 Jul 66, 6p FTD-HT-66-159
TT-67-60212
Unedited rough draft trans. of Prikladnaya Matematika i Mekhanika (USSR) v19 n1 p103-5 1955.

Descriptors: (*Laval nozzles, Design), Axially symmetric flow, Mathematical analysis, USSR.

Partial solutions to the approximation equations are given of the plane and axisymmetrical flow of a gas. It is possible to make use of these particular solutions in making the computations for designing nearsonic parts of nozzles. (Author)
AD-643 632 HC$3.00 MF$0.65

PROCEEDINGS OF THE GROUP SCIENTIFIC AND TECHNICAL CONFERENCE ON PROBLEMS OF FLUID MECHANICS (SELECTED PARTS),
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. N. Orlov, A. S. Freidin, G. M. Gorelov, V. K. Lyakhov, and A. V. Temnikov. 13 Oct 66, 73p
FTD-TT-65-1366
TT-67-60203
Doklady Kustovoi Nauchno Tekhnicheskoi Konferentsii Po Voprosam Medhaniki Zhidkosti i Gasa. Unedited rough draft trans. Aviatsionnyi Institut, Kuybyshev. Trudy (USSR) v15 (sic) p106-56, 299-307 1963.

Descriptors: (*Fluid mechanics, *Symposia), (*Heat transfer, Symposia), Diffusers, Gas flow, Heat exchangers, Thermodynamics, Turbulence, Fluid flow, USSR.

Table of Contents: Experimental determination of heat exchange intensification in a biangular channel with local expansion of the conduit cross section, Some results of an analysis of experimental data on the intensification of heat emission in channels, The calculation of thermal characteristics of heat exchange devices, Some results of wind tunnel tests of plane diffuser cascades with low rates of flow, Results from an experimental investigation of a diffuser with additional flow pressure at the outlet, Coefficients of heat transfer and hydraulic resistance as functions of longitudinal and transverse nonisothermicity in turbulent motion of fluid under internal-problem conditions, Application of electrothermal analogy to study of heat transfer in streamlined bodies of arbitrary shape.
AD-643 643 HC$3.00 MF$0.65

HYPERSONIC FLOW AROUND A TRIANGULAR PLATE WITH BLUNTED LEADING EDGES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. V. Lunev. 21 Nov 66, 19p FTD-TT-65-1907
TT-67-60202
Giperzuvukovoe Obtekhavie Treugolnoi Plastiny s Prituplennymi Perednimi Kromkami, unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika, n3 p9-16 1965.

Descriptors: (*Hypersonic flow, Flat plate models), (*Blunt bodies, Leading edge), Pressure, Distribution, Thickness, Mathematical analysis, USSR, Entropy.

An analysis is made of the problem of a hypersonic flow without an angle of attack around a triangular plate with an angle 20 having a vertex with a resistance c sub x (d) constant over the edge, where d is the thickness and cx is the coefficient of resistance of the transverse section of the edge. For obtaining the reviewed qualitative results, a very simple two-layer scheme of flow is taken in whose framework the area is sufficiently removed from the forward edge, there is found the pressure distribution over the plate, the thickness of the high-entropy layer and the distance of the average speed in it. (Author)
AD-643 644 HC$3.00 MF$0.65

LOW-SPEED AERODYNAMICS OF THE DUCTED PROPELLER,
Therm Advanced Research, Inc., Ithaca, N. Y.
Michael D. Greenberg, and Donald Earl Ordway. 17 May 65, 11p
Contract Nonr-4357 (00)
Availability: Published in Zeitschrift fur Flugwissenschaften v14 n8 p363-72 1966.

Descriptors: (*Shrouded propellers, *Aerodynamic loading), Statics, Pitch (Motion), Wake, Vortices, Integral equations.

A three-dimensional theory is developed for the steady aerodynamic loading on a finite-bladed ducted propeller at zero incidence in low-speed flight, including the static condition. The interaction with the higher harmonics is clarified and it is shown that, for the sake of tractability, a high blade-number restriction is required. Subject to a constant-pitch assumption on the propeller vortices which is later relaxed, an analytic solution is obtained together with simple expressions for the shroud thrust and surface pressures. Results of a limited comparison with experiment are reasonable. (Author)
AD-643 683 Not available from CFSTI.

ABOUT PRANDTL'S INTEGRODIFFERENTIAL EQUATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. N. Vekua. 2 Sep 66, 14p FTD-HT-66-149
TT-67-60262
Unedited rough draft trans. of Prikladnaya Matematika i Mekhanika (USSR) v9 n2 p143-50 1945.

Descriptors: (*Wings, Gas flow), Integral equations, Differential equations, Prandtl number, USSR.

Air flow along a wing of finite span is analyzed mathematically.
AD-643 738 HC$3.00 MF$0.65

COMPUTER PROGRAMS FOR TOWED ARRAY STABILITY ANALYSIS,
Naval Ordnance Lab., White Oak, Md.
For primary bibliographic entry see Field 20A.
AD-643 752 HC$3.00 MF$0.65

ON THE LOGARITHMIC DENSITY BEHAVIOR OF A NONEQUILIBRIUM BOLTZMANN GAS,
Princeton Univ., N. J. Plasma Physics Lab.
Robert Goldman, and Edward A. Frieman. Sep 66, 60p PPL-AF-7
Contract AF 49 (638)-1555
Prepared in cooperation with Maryland Univ., College Park.

Descriptors: (*Gases, Density), Statistical functions, Operators (Mathematics), Equations, Nonequilibrium flow.

In a previous paper, the usual low-density expansion applicable to a Boltzmann gas was carried out, using a multiple time and space scale technique, to yield an expression for the lowest order two-particle correlation function on the scale of the collision time and the mean free path. In the present paper this technique was extended by introducing streaming operators which are generalizations of the operators first used by Bogoliubov and which allow higher order corrections in epsilon to the correlation functions to be obtained. The new result which this technique yields is the appearance of correction terms which are logarithmic in the density. (Author)
AD-643 [illegible] HC $3.00 MF $0.65

A SINGLE-IMPULSE SYSTEM FOR GENERATING SOLITARY, UNDULATING SURGE, AND GRAVITY SHOCK WAVES IN THE LABORATORY.
Chicago Univ., Ill. Fluid Dynamics and Sediment Transport Lab.
For primary bibliographic entry see Field 14B.
AD-643 823 HC$3.00 MF$0.65

RESULTS OF AN ATTEMPT TO GENERATE A HOMOGENEOUS TURBULENT SHEAR FLOW,
Johns Hopkins Univ., Baltimore, Md. Dept. of Mechanics.
W. G. Rose. 20 Aug 65, 25p
AFOSR-66-2677
Contract AF 49 (638)-1303
Availability: Published in J. Fluid Mech v25 pt1 p97-120 1966.

Descriptors: (*Turbulence, Gas flow), (*Gas flow, Shear stresses), Wind tunnels, Anemometers, Energy, Production, Instrumentation, Fluid dynamic properties.
Identifiers: Shear flow.

An approximately homogeneous turbulent shear flow was generated in an open-return wind tunnel test-section by a plane parallel-rod grid of uniform rod diameter and non-uniform rod spacing. Hot-wire measurements taken in this flow include mean velocities, component turbulence intensities, shear and two-point space correlations, and energy spectra. The results lead to the conclusions that at sufficiently large distances from the generating grid and wall boundary layers, the turbulence intensities are maintained at uniform values by the constant mean shear, the turbulent shear approaches an asymptotic value, two-point space correlation coefficients and one-dimensional energy spectra attain self-preserving forms, and the turbulence scales over the extent of test section available to measurement increase with distance from the grid. The goal of completely homogeneous turbulent shear flow was not obtained. (Author)
AD-643 [illegible] Not available from CFSTI

FREE MOLECULE SURFACE SOURCES AND SINKS AND APPLICATIONS. PART II. COMPARISON WITH EXPERIMENTAL RESULTS.
Technical note,
Politecnico di Torino (Italy). Istituto di Meccanica Applicata.
Silvio Nocilla. Dec 65, 23p TN-36, Scientific-12
AFOSR-66-2741
Grant AF-EOAR-98-63
See also AD-631 101.

Descriptors: (*Superaerodynamics, *Kinetic theory), Distribution functions, Molecular properties, Sources, Surfaces, Molecular beams, Italy.

A comparison is made between the theory developed in the first part (AD-631 101) and the experimental results obtained with the technique of the molecular beams by Datz, Moore and Taylor, Jawtusch, Smith and Fite, and some theoretical diagrams of magnitudes so far not measured experimentally are plotted. (Author)
AD-643 879 HC$3.00 MF$0.65

NUMERICAL SOLUTION OF SOME PROBLEMS OF GAS FLOW,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
P. I. Chushkin. 16 Sep 66, 31p FTD-TT-65-1826
Unedited rough draft trans. of Archiwum Mechaniki Stosowanej (Poland) v16 n3 p577-96 1964.

Descriptors: (*Gas flow, Numerical analysis), Subsonic flow, Transonic flow, Laval nozzles, One-dimensional flow, Supersonic flow, Blunt bodies, Magnetic fields, Angle of attack, Poland.

A description is given of the numerical calculation of the potential flow in the subsonic and transonic part of a Laval nozzle, the method of computing the unsteady one-dimensional flow during explosions in the gas, the solution of the problem concerning the flow of a supersonic stream of conducting gas around blunt magnetized bodies and, finally, a calculation scheme of the numerical method of characteristics by layers, suitable for being applied to the case of calculating the flow around bodies under an angle of attack. (Author)
AD-643 895 HC $3.00 MF $0.65

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[illegible]

[illegible]

identified by this calibration, and flow conditions within these regimes are given. The boundary-layer control technique permitted the attainment of indicated Knudsen numbers one order of magnitude greater than those produced with no boundary-layer control. At the lowest levels of static density produced in the nozzle with boundary-layer control, evidence of an entropy-increasing process was found which was tentatively identified as a departure from rotational equilibrium in the flow. (Author)
AD-643 963 HC$3.00 MF$0.65

IMPROVEMENT OF A METHOD OF RADIOWAVE SOUNDING GAS, HEATED BY A SHOCK WAVE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 14B.
AD-644 016 HC$3.00 MF$0.65

AN INVESTIGATION OF THE VORTICITY INTERACTION BY PERTURBATION TECHNIQUES,
New York Univ., N. Y. Dept. of Aeronautics and Astronautics.
Egon Krause. Oct 66, 57p NYU-AA-66-64
Contract Nonr-285 (63)

Descriptors: (*Blunt bodies, Aerodynamics), (*Boundary layer, *Vortices), Perturbation theory, Interactions, Integration, Entropy, Analysis of variance.

The interaction between the boundary layer and the vortical layer on the aft portion of blunted bodies is investigated. It is assumed that the boundary layer thickness is much smaller than that of the vortical layer so that the boundary conditions at the common boundary can be provided by asymptotic matching of the two layers. The zero- and first order solutions for the outer and inner layer are established by numerical integration. The flow equations for the boundary layer are solved by finite-difference integration, while the solution for the vortical layer is established by the method of characteristics. (Author)
AD-644 026 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF THE FORMATION OF A GAS JET BEHIND THE FRONT OF A SHOCK WAVE IN THE OUTFLOW OF DIVERGENT AND SUPERSONIC NOZZLES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. I. Sternfinov. 14 Jul 66, 9p FTD-HT-66-137
Unedited rough draft trans. of Leningrad Univ. Vestnik (USSR) v20 n19, Seriya Matematiki, Mekhaniki i Astronomii, p4 p166-68 1965.

Descriptors: (*Jets, Nozzle gas flow), Shock waves, Supersonic nozzles, Wake, Mathematical models, USSR.

A shock tube was used in carrying out the investigations. Dimensions of the nozzles used in the experiment are given together with empirical formulas obtained.
AD-644 046 HC$3.00 MF$0.65

NEWS OF SCHOOLS OF HIGHER EDUCATION AERONAUTICAL ENGINEERING: VOL. 7, NO. 3, 1964, COLLECTION OF ARTICLES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 1B.
AD-644 068 HC$3.00 MF$0.65

HIGHLY SIMPLIFIED CALCULATION OF THE INCOMPRESSIBLE LAMINAR BOUNDARY LAYER.
Technical note.
Politecnico di Torino (Italy). Istituto di Meccanica Applicata.
Gianni Jarre. Dec 65, 20p TN-35, Scientific-11
AFOSR-66-2742
Grant AF-EOAR-98-63

Descriptors: (*Laminar boundary layer, Fluid flow), (*Incompressible flow, Laminar boundary layer), Slender bodies, Leading edge, Acceleration, Walls, Shear stresses, Aerodynamics, Motion, Velocity, Cylindrical bodies, Stagnation point, Integration.

A highly simplified calculation of the incompressible laminar boundary layer under any variable pressure gradient, is outlined and satisfactorily applied to accelerated and retarded flows. The method allows to derive directly the shear stress at the wall from the outer velocity law. The method is very promising in the field of the aeronautical slender bodies.
AD-644 129 HC$3.00 MF$0.65

KONSTANTIN EDUARDOVICH TSIOLKOVSKII: SELECTED WORKS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 1B.
AD-644 143 HC$3.00 MF$0.65

AN EXPERIMENTAL STUDY OF GRID TURBULENCE IN DILUTE HIGH-POLYMER SOLUTIONS.
Technical paper.
Naval Ordnance Test Station, China Lake, Calif.
A. G. Fabula. Nov 66, 54p NOTS-TP-4225

Descriptors: (*Turbulence, *Additives), (*Lubricants, Polymers), Solutions, One-dimensional flow, Flowmeters, Ethylene oxide, Amides, Viscoelasticity.
Identifiers: Polyacrylamides, Polyoxyethylenes, Guar gum.

Longitudinal, one-dimensional turbulence spectra were measured behind a towed grid in dilute aqueous high-polymer solutions. Several types of hot-film flowmeters with constant-temperature bridges were used, with emphasis on quartz-coated, platinum-film sensors of conical shape. Measurements in water were consistent with wind-tunnel measurements. Cylindrical sensors were found unsuitable. The additives were poly (ethylene oxides), polyacrylamides, and guar gum. Concentrations of up to 137 ppm were used. The guar gum produced temporary suspensions which were not suitable for turbulence measurements because of high noise level. With the other additives, the sensor signal near the grid included a high-frequency component (called raggedness) which was attributed to temporary (or temporarily altered) inhomogeneity caused by the grid bars. Three types of spectral effects were the distortion due to raggedness, a greater experimental scatter near the grid in newly prepared solutions, and the predictable shift due to viscosity increase. (Author)
AD-644 148 HC$3.00 MF$0.65

A TIME-SHARED PROGRAM SYSTEM FOR THE SOLUTION OF THE STABILITY PROBLEM FOR PARALLEL FLOWS OVER RIGID OR FLEXIBLE SURFACES,
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
M. T. Landahl. Oct 66, 49p ASRL-116-4
Contract Nonr-1841 (89)

Descriptors: (*Incompressible flow, Stability), (*Computer programs, Fluid flow), Time sharing, Surfaces, Hydrodynamic configurations, Mechanical properties, Equations, Boundary layer, Fluid dynamic properties.

The report describes a system of programs, designed to be used on the MIT Compatible Time Sharing System (CTSS), for solving the Orr-Sommerfeld parallel-flow stability problem of incompressible flow in contact with a rigid or flexible surface. The programs can be combined, building-block fashion, to treat a large variety of cases. As examples are shown: (1) Blasius' boundary layer over a flexible membrane, (2) turbulent boundary layer over a free-water surface, and (3) free shear layer. (Author)
AD-644 162 HC$3.00 MF$0.65

VISUALIZATION OF TRANSITION PHENOMENA IN THE BOUNDARY LAYER ON THE BLADES OF A TURBINE CASCADE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. Ya. Ipatenko, and A. M. Antonov. 29 Jul 66, 10p FTD-HT-66-319
TT-67-60322
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) n3 p76-82 1965.

Descriptors: (*Boundary layer transition, *Flow visualization), (*Turbine blades, Boundary layer transition), Cascade structures, Sublimation, Evaporation, Gas turbine blades, USSR.
Identifiers: Kaolin.

In investigating the flow in the boundary layer on the blades of a cascade to determine the line of transition from laminar flow to turbulent flow and to establish the boundaries of the effect of the face walls of the channel, the kaolin and the sublimation methods can be successively applied. Both methods are approximately equivalent. The kaolin method is somewhat more convenient and gives a clearer boundary between the regions. (Author)
AD-644 167 HC$3.00 MF$0.65

EXPANSION AND FLOW CHARACTERISTICS OF INITIALLY SATURATED SODIUM, POTASSIUM, AND CESIUM VAPORS.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
L. J. Goldman. Nov 66, 21p NASA-TN-D-3743
Contract 120-27-04-04-22

Descriptors: *Cesium vapor, *Expansion, *Flow characteristics, *Potassium, *Sodium vapor, Cesium, Characteristics, Equilibrium, Flow, Heat, Nozzle, Nucleation, Pressure, Saturation, Sodium, Vapor, Weight.

For abstract, see STAR 05 02.
N67-11329 HC$3.00 MF$0.65

LIQUID HYDROGEN PRESSURIZATION TESTS FINAL TEST REPORT, 29 MAY 1963 - 27 AUG. 1964.
Beech Aircraft Corp., Boulder, Colo. Environmental Test Labs.
T. Bielawski, A. R. Lowrie, and J. R. Mabbitt. 25 Nov 64, 139p NASA-CR-79092, FR-13632
Contract NAS8-5331

Descriptors: *Heat exchanger, *Liquid hydrogen, *Pressurization, Exchanger, Fluid, Flux, Heat, Hydrogen, Liquid, Mechanics, Missile, Procedure, Saturn, Tank, Test, Thermal, Thermocouple, Titanium, Vacuum.

For abstract, see STAR 05 02.
N67-11396 HC$3.00 MF$0.65

ASSESSMENT OF SLOSH COUPLING WITH SPACE VEHICLE FINAL REPORT.
General Dynamics/Convair, Huntsville, Ala.
M. O. Clark, and L. L. Fontenot. 24 Oct 66, 83p
NASA-CR-79541, GD/C-DDF-66-008
Contract NAS8-20302

Descriptors: *Attitude, *Liquid propellant, *Liquid sloshing, *Space vehicle, Analog, Coupling, Energy, Equation, Formulation, Hydrodynamics, Mechanical, Motion, Perturbation, Stability.

For abstract, see STAR 05 02.
N67-11736 HC$3.00 MF$0.65

[illegible]

Descriptors: "Flow visualization, "Vortex tube, "Water flow, Aspect, Color, Configuration, Drive, Dye, Flow, Injection, Jet, Photography, Ratio, Secondary, Tube, Visualization, Vortex, Water.

For abstract, see [illegible]
[illegible]

[illegible]

Descriptors: "Bibliography, "Diffusion coefficient, "Transport coefficient, "Turbulent flow, "Viscous flow, Boundary, Coefficient, Diffusion, Flow, Free, Gas, Heat, Layer, Liquid, Mass, Measurement, Phase, Polymer, Solid, Temperature, Transport, Turbulent, Viscous.

For abstract, see [illegible]
[illegible]

[illegible]

Quelques Resultats Sur Les Caracteristiques Thermiques Des Couches Limites Turbulentes A Temperature Elevee
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
P. Mestre, and R. Michel. May 65, 32p TP-216/1966/
1965 P 65-95 Refs In French, English Summary

Descriptors: *Energy equation, *Enthalpy, *Flat plate, *Heat transfer, *Turbulent boundary layer, Boundary, Concentration, Distribution, Energy, Equation, Flat, Flux, Forebody, Friction, Globe, Heat, Integration, Layer, Plate, Turbulent, Wall.

For abstract, see STAR 05 02.
N67-11873 HC$3.00 MF$0.65

ANALOGIC DEVICE FOR STATISTICAL MEASUREMENTS OF CORRELATION IN TIME.
Appareil Analogique De Mesures Statistiques De La Correlation Dans Le Temps
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
A. Favre, and J. Gaviglio. 1966, 33p TP-361/1966/
In French Presented At The Colloq. On The Statist. Treat. Of Measurement, Grenoble, France, 26-29 Apr. 1966

Descriptors: *Analog data, *Electrocardiogram, *Statistical correlation, *Time function, *Turbulent flow, Analog, Correlation, Data, Delay, Flow, Fluid, Function, Mechanics, Noise, Signals, Statistical, Subsonic, Supersonic, Time, Turbulent.

For abstract, see STAR 05 02.
N67-11917 HC$3.00 MF$0.65

PSEUDO-SONIC VELOCITY AND PSEUDO-MACH NUMBER CONCEPTS IN TWO-PHASE FLOWS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
J. W. Bursik. Dec 66, 39p NASA-TN-D-3734
refs

Descriptors: *Liquid-vapor interface, *Thermodynamics, *Two-phase flow, Choke, Concept, Duct, Flow, Flow velocity, Gas, Interface, Isentropic, Liquid, Mach number, Phase, Pipe, Pressure, Pseudorandom, Sonic, Two, Vapor, Velocity.

For abstract, see STAR 05 02.
N67-11957 HC$3.00 MF$0.65

[illegible]

Descriptors: "Propellant transfer, "Space vehicle, "Weightlessness, Behavior, Capillary, Cylinder, Dimension, Flow, Interface, Liquid, Pressure, Propellant, Space, Tank, Transfer, Vapor, Vehicle.

For abstract, see [illegible]
[illegible]

[illegible]

Contribution A L'etude Experimentale De La Couche De Melange Turbulente Isobare D'un Ecoulement Supersonique
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
M. Seven, and J.-L. Delapine. 1966, 30p TP-327/1966/
In French Presented At The Meeting Of Agard Specialists On Detached Flows, Rhode St. Genese, France, 10-13 May 1966

Descriptors: *Boundary layer, *Supersonic flow, *Turbulent mixing, Atmosphere, Boundary, Chemical, Concentration, Flow, Isobar, Layer, Mixing, Pressure, Profile, Supersonic, Temperature, Theory, Turbulence, Turbulent, Velocity.

For abstract, see STAR 05 02.
N67-11979 HC$3.00 MF$0.65

USE OF TURBULENCE AS A SOURCE OF EXCITATION DURING FLUTTER FLIGHT TESTS.
Utilisation De La Turbulence Comme Source D'excitation Lors D'essais En Vol De Flottement
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
G. Coupry, and G. Piazzoli. 1966, 26p TP-362/1966/
In French, English Summary Presented At The 5th Congr. Of The Intern. Council Of The Aeron. Sci., London, 12-16 Sep. 1966

Descriptors: *Damping, *Flight test, *Turbulence, Coefficient, Excitation, Flight, Flutter, Measurement, Mode, Source, Structure, Test.

For abstract, see STAR 05 02.
N67-11995 HC$3.00 MF$0.65

GAS CONTENT, SIZE, TEMPERATURE AND VELOCITY EFFECTS ON CAVITATION INCEPTION INTERNAL REPORT NO. 31.
Michigan Univ., Ann Arbor. Lab. For Fluid Flow And Heat Transport
D. M. Ericson, F. G. Hammitt, and M. J. Robinson. Aug 66, 60p NASA-CR-79514, REPT.-03424-31-I
Grant NSG-39

Descriptors: *Cavitation flow, *Gas dynamics, *Venturi tube, Air, Cavitation, Content, Dynamics, Flow, Fluid, Gas, Mercury, Roughness, Size, Surface, Temperature, Thermodynamics, Throat, Tube, Velocity, Water.

For abstract, see STAR 05 02.
N67-12220 HC$3.00 MF$0.65

GAS CONTENT, SIZE, TEMPERATURE AND VELOCITY EFFECTS ON CAVITATION INCEPTION INTERNAL REPORT NO. 31.
Michigan Univ., Ann Arbor. Lab. For Fluid Flow And Heat Transport
D. M. Ericson, F. G. Hammitt, and M. J. Robinson. Aug 66, 60p NASA-CR-80169
Eng Dept. 03424-31-I

Descriptors: "Gaseous cavitation, "Venturi tube, Air, Cavitation, Content, Damage, Effect, Gas, Hydrodynamics, Mercury, Size, Temperature, Throat, Tube, Variable, Velocity, Water.

For abstract, see STAR 05 02.
N67-12265 HC$3.00 MF$0.65

[illegible]

Descriptors: "Gas injection, "Gust load, "Wind tunnel models, Aerodynamics, Air, Frequency, Gas, Gust, Injection, Load, Steady, Simulation, Tunnel, Upstream, Wind.

For abstract, see [illegible]
[illegible]

20F. MASERS AND LASERS

TIME RESOLVED STUDIES OF LASER-PRODUCED PLUMES FROM SOLIDS.
Naval Ordnance Lab., White Oak, Md.
For primary bibliographic entry see Field 20I.
AD-643 509 HC$3.00 MF$0.65

ON THE "SATURATION" LUMINANCE OF HIGH-DENSITY MICROSECOND-ARC CHANNELS.
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
For primary bibliographic entry see Field 20F.
AD-643 515 HC$3.00 MF$0.65

LASER.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Chu Ang-ju, 21 Nov 66, 20p FTD-TT-65-1453/1 TT-67-60190
Edited trans. of Tien Tzu Chi Shu (Chinese People's Republic) n3 p24-8 1964.

Descriptors: (*Lasers, China), Propagation, Scientific research, Ruby, Gases, Modulation.

The similarities between light and electromagnetic waves are compared. The laser oscillator is described along with laser radiation. The use of the laser in space research, communication, medicine, photography, etc., is described. The ruby laser and a gaseous state laser are described. (Author)
AD-643 606 HC$3.00 MF$0.65

MOSCOW UNIVERSITY HERALD. SERIES III. PHYSICS, ASTRONOMY, VOL. 20, NO. 5, 1965: SELECTED ARTICLES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. P. Komolov, F. A. Korolev, and S. M.

Mamedzade. 7 Dec 66, 11p FTD-HT-66-276 TT-67-60191
Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 3: Fizika Astronomiya (USSR), v20 n5 p89-92 1965.

Descriptors: (*Frequency dividers, Design), (*Lasers, Ruby), Electronic equipment, Oscillators, Refractive index, Resonators, Narrowband, Synchronization (Electronics), Circuits, Stability.

Contents: Circuits of Parametron Frequency Dividers; Narrowing of Emission of a Ruby Laser with a Complex Resonator.
AD-643 625 HC$3.00 MF$0.65

PRODUCTION ENGINEERING MEASURE FOR RUBY LASER RODS.
Quarterly progress rept. no. 4, 1 Apr-30 Jun 66,
Union Carbide Corp., East Chicago, Ind. Electronics Div.
W. R. Towne, O. M. Stoner, and L. R. Rothrock. 30 Jun 66, 16p
Contract DA-36-039-AMC-00160 (E)
See also AD-642 289.

Descriptors: (*Lasers, Rubys), (*Ruby, Crystal growth), Manufacturing methods, Rods, Range finding.

Additional multi-variable runs have been completed in the process engineering studies. These runs have established optimum values for process parameters for ruby growth in a furnace chamber of specific size. It was shown that, contrary to original expectations, the pulsed powder feed system is preferred over continuous feed. A description of the system and procedures used in active laser rods is presented. The results of active and passive tests on all engineering samples are summarized and discussed. (Author)
AD-643 939 HC$3.00 MF$0.65

SESSIONS OF THE SECTION ON GENERAL AND APPLIED PHYSICS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20C.
AD-643 875 HC$3.00 MF$0.65

SOVIET QUANTUM ELECTRONICS RESEARCH: COMPREHENSIVE REPORT.
Library of Congress, Washington, D. C. Aerospace Technology Div.
Yuri Ksander. 2 Aug 66, 132p ATD-66-97 TT-67-60248
Rept. on Surveys of Foreign Scientific and Technical Literature.

Descriptors: (*Electronics, USSR), (*Lasers, *Bibliographies), Semiconductors, Ruby, Gas lasers, Optics, Spectroscopy.
Identifiers: Quantum electronics.

The report reviews Soviet and Soviet-bloc laser research as reflected in the open scientific literature published in the USSR and the bloc countries. The report is the second in the series and is based on 634 research and review papers which cover the period from September 1964 through February 1966, i.e., eighteen months. The first appeared as ATD Report P-65-23 (AD-615 177) and covered the period from January 1961 through August 1964. The review is divided into sections, each section covering the work of a particular organization (a research institute, a laboratory, or a university). These sections are, in most cases, subdivided into specialized subject areas. The review sections are arranged in the order in which they are discussed in the sections and are keyed to the appropriate review section by letter designation.
AD-643 937 HC$3.00 MF$0.65

LASER LIGHT ADVANCES IN AVIATION.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yen You Chin. 23 Sep 66, 16p FTD-TT-65-361
Edited trans. of Hang K'ung Chih Shih (Chinese People's Republic) n7 p7-12 1964.

Descriptors: (*Lasers, Aeronautics), Light communication systems, Optical tracking, Opdar, Optical equipment, Range finding, China.

The article examines laser light advances in the field of aviation and its applications in communications, searching, tracking and interception.
AD-643 959 HC$3.00 MF$0.65

ON THE CHARACTERISTICS OF INDUCED COMBINED DISPERSION IN BENZENE.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20F.
AD-644 009 HC$3.00 MF$0.65

A METHOD OF SUMMING THE POWER IN LASERS WITH EACH OF THEM WORKING COHERENTLY.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
M. E. Zhabotinskii, and G. A. Vanneva. 9 Sep 66, 6p FTD-HT-66-107
Unedited rough draft trans. of Patent (USSR) 172 357, appl. 810263/26/25, 11 Apr 63.

Descriptors: (*Lasers, Power), Emissivity, USSR, Patents, Coherent radiation.

The method of summing the power in lasers when each of them is working coherently is different in that to increase the power and directivity of emission of the lasers, part of the beam is selected, sequentially distributed between neighboring lasers and, to scan the main lobe of the emission diagram, it is sent to phase inverters placed in the output beams of the lasers. (Author)
AD-644 042 HC$3.00 MF$0.65

LASERS ON A CONVEYER.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. Lisovskii, and M. Stelmakh. 27 Sep 66, 6p FTD-HT-66-228
Unedited rough draft trans. from Izvestiya (USSR) 29 Apr p4 1965.

Descriptors: (*Gas lasers, Semiconductors), Pulse generators, Gases, Excitation, Electron beams, Focusing, Ruby, Spectra (Infrared), Spectra (Visible + Ultraviolet), Amplifiers.

Presently started is the manufacture of four types of gas lasers which give irradiation in visible and infrared areas of the spectrum with a power of fractions of a milliwatt to 15 milliwatts. Semiconductor quantum generators are compact, where weight is considerably lower, than other types of optical quantum generators, but the require cooling with liquid nitrogen. Gaseous and semiconductor lasers pertain to the category of 'little power' ones. Much more intensive is the beam of light given by lasers with solid active substance, for example, ruby or special glass.
AD-644 047 HC$3.00 MF$0.65

AN INTERFEROMETRIC RANGING SYSTEM.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. M. Tillson. Sep 66, 75p NASA-TM-X-55608, X-524-66-408

Descriptors: *Continuous wave, *Gas laser, *Interferometry, Beam, Continuous, Distance, Frequency, Gas, Laser, Line, Measurement, Noise, Phase, Ranging, Signal, Spectral, Stability, Wave.

For abstract, see STAR 05 02.
N67-11380 HC$3.00 MF$0.65

DEVELOPMENT OF LASERS FOR PLASMA DIAGNOSTICS.
Case Inst. Of Tech., Cleveland, Ohio.
W. B. Johnson, and T. P. Sosnowski. Jul 64, 114p NASA-CR-79511, A-29
Grant NSG-198

Descriptors: *Electron density, *Gas laser, *Optical heterodyne, *Plasma dynamics, Construction, Current, Density, Dynamics, Electron, Gas, Helium, Heterodyne, Laser, Neon, Operation, Optical, Plasma, Pressure, System.

For abstract, see STAR 05 02.
N67-11738 HC$3.00 MF$0.65

A PRELIMINARY INVESTIGATION OF LASER ACTION ASSISTED BY OXIDIZED HYDROCARBONS.
Ohio State Univ. Research Foundation, Columbus. Dept. Of Electrical Engineering.
B. F. Jacoby. 7 Oct 66, 12p NASA-CR-80090, RF/PT-1093-32
Grant NSG-74-60

Descriptors: *Chemical laser, *Hydrocarbon, Apparatus, Chemical, Discharge, Electron, Far, Generation, Infrared, Laser, Light, Line, Mirror, Tube.

For abstract, see STAR 05 02.
N67-12260 HC$3.00 MF$0.65

20F. OPTICS

HEMISPHERICAL REFLECTANCE OF METAL SURFACES AS A FUNCTION OF WAVELENGTH AND SURFACE ROUGHNESS.
Technical rept.,
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
R. C. Birkebak, J. P. Dawson, B. A. McCullough, and B. E. Wood. Oct 65, 26p AEDC-TR-65-170
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn. and Georgia Inst. of Tech.

Descriptors: (*Reflection, Metals), (*Metal coatings, Reflection), Surface properties, Hemispherical shells, Metal films, Aluminum, Gold, Platinum, Nickel, Stresses, Infrared radiation.
Identifiers: Roughness.

Measure rents of the hemispherical reflectance of metallic surfaces with controlled surface roughness were made using a sulfur infrared integrating sphere and a beckman DC2A spectrometer. The surfaces studied were ground glass and nickel coated with films of aluminum, gold, platinum, and nickel. The data indicate that beyond a certain ratio of surface roughness to incident wavelength, the normalized data for aluminum, gold, and platinum may be represented by a single curve. This was true for the unidirectional as well as the isotropic roughnesses. Although the nickel data deviated from this curve, the causes for this deviation are believed to be associated with high surface stresses caused by changes in the crystalline structure and are discussed. (Author)
AD-472 767 HC$3.00 MF$0.65

THE FIELD ION MICROSCOPICBL IMAGE OF AN ORDERED PLATINUM-COBALT ALLOY.
Technical rept.,
Pennsylvania State Univ., University Park. Dept. of Physics.
Tien Tzou Tsong, and Erwin W. Muller. 9 May 66, 5p TR-11
Contract Nonr-656 (23)
See also AD-643 477.
Availability: Published in Applied Physics v9 n1 p7-10 Jul 1 1966.

Descriptors: (*Microscopy, Ions), (*Platinum alloys, Cobalt alloys), Images, Crystal structure, Atomic structure, Band theory of solids.

The observation that in ordered Pt-Co one atom species is not imaged indicates not only that the band structure of a metal is responsible for the field ionization process, as was also concluded from the crystallographically specific area brightness, but that the electronic charge of a constituent surface-atom species may have an overriding effect.
AD-643 447 Not available from CFSTI.

CURRENT-VOLTAGE CHARACTERISTICS BY IMAGE PHOTOMETRY IN A FIELD ION MICROSCOPE.
Technical rept.,
Pennsylvania State Univ., University Park. Dept. of Physics.
Tien Tzou Tsong, and Erwin W. Mueller. 21 Mar 66, 7p TR-9
Contract Nonr-656 (23)
See also AD-630 572.
Availability: Published in Journal of Applied Physics v37 n8 p3065-70 Jul 1966.

Descriptors: (*Microscopes, Ions), Ionic current, Voltage, Images, Performance (Engineering), Brightness, Field emission, Temperature, Calibration.
Identifiers: Field ion microscopes.

Current-voltage characteristics of a FIM were determined indirectly through total image photometry in order to avoid known difficulties with ion current measurements. Relative phosphor screen efficiencies as a function of ion energy were calibrated separately. The total ion current under isothermal conditions is found to depend more sensitively upon the temperature than the 1/T power predicted by the present theory. The total ion current remarkably depends also on the tip temperature when the gas temperature is kept constant. Both temperature effects indicate that only a fraction of the gas molecules attracted to the tip by polarization contributes to the ion current. From the emitter cone-angle dependence of the slope in the imaging range of the log I-log V plot and from the time-lag effect after changing the emitter temperature it is concluded that the initial arrival of molecules at the emitter shank contributes significantly to the image gas supply. Image photometry can be used as a simple means to monitor the tip temperature with sufficient accuracy for most practical purposes. (Author)
AD-643 476 Not available from CFSTI.

IN-SITU MANIPULATION OF FIELD ION MICROSCOPE SPECIMENS.
Technical rept.,
Pennsylvania State Univ., University Park. Dept. of Physics.
Erwin W. Mueller, S. Brooks McLane, and Osamu Nishikawa. Sep 66, 3p TR-10
Contract Nonr-656 (23)
Supported in part by NSF. See also AD-643 476.
Availability: Published in Proceedings of the International Congress on Electron Microscopy (6th), Kyoto (Japan), v1 p235-6 Sep 1966.

Descriptors: (*Microscopes, Ions), Field emission, Operation, Calibration, Images, Crystal lattice defects, Lasers, Heating.
Identifiers: Field ion microscopes.

The FIM is suitable for the study of lattice defects, but a cautious image interpretation is required because of the occurrence of artifacts due to polarization and field stress. In-situ introduction of lattice defects, desirable for differential analysis, has been applied for the study of fatigue and radiation damage. The cryogenic temperature of the specimen conveniently halts all thermally activated secondary structure changes. Two new techniques are presented with some preliminary results, the mechanical contacting of the tip, and the laser pulse heating. (Author)
AD-643 477 Not available from CFSTI.

ON THE 'SATURATION' LUMINANCE OF HIGH-DENSITY MICROSECOND-ARC CHANNELS.
Physical sciences research papers,
Air Force Cambridge Research Labs., L. G. Hanscom Field, Mass.
Heinz Fischer, and Lothar Michel. Oct 66, 13p
AFCRL-PSRP-272, AFCRL-66-691

Descriptors: (*Electric arcs, Plasma medium), (*Luminescence, *Plasma medium), Brightness, Argon, Helium, Images.

The emission of high-current microsecond-arc channels with a 1-mm gap has been studied in argon and helium by means of a 20-nsec Kerr-cell shutter and profiles of the relative luminance B determined from photographs of the arc image. The method is practically unaffected by instabilities in arc position, and the accuracy of relative luminance values has been perfected to a scatter smaller than plus or minus 5%. From maximum values of the 'saturation' luminance B* in the axis of the arc channel observed over a wide range of arc current altered by the gas pressure, a ratio of $B^*He/B^*A = 1.52$ for the two gases has been determined. The luminance profile across the arc channel demonstrates increasing opacity after saturation is reached. (Author)
AD-643 515 HC$3.00 MF$0.65

A RAPID METHOD OF INSTALLING EXIT SLITS IN A JARRELL-ASH EBERT CONVERTIBLE SPECTROGRAPH,
National Research Council of Canada, Ottawa (Ontario). Div. of Applied Chemistry.
P. Tymchuk, A. Mykytiuk, D. S. Russell, and S. S. Berman. 1966, 7p
NRC-9237
Availability: Published in Canadian Spectroscopy v11 n4 Sep 1966.

Descriptors: (*Spectrum analyzers, Design), Telescopes, Canada.

It was found that the slits can be installed more easily and more precisely by using a laboratory cathetometer. The instrument is mounted horizontally on a rigid wooden stand at the same height as the exit slits. It is adjusted so that the slits can be brought into sharp focus in the telescope. By using the mercury line as a reference point, measurements of the slit positions may be made directly on the slits themselves rather than on the base of the slit mounting, thus eliminating considerable uncertainty. In this manner a slit can be mounted close enough to the actual position of the line, that it is easily within the range traversed by the refractor plate. In addition, by using the cross hair in the telescope, the slits may easily be adjusted parallel to the lines. Although the slit mounting bar is somewhat curved, this does not seriously interfere with the measurements. (Author)
AD-643 580 Not available from CFSTI.

A DEVICE FOR DEFLECTING A LIGHT BEAM,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. A. Shamburov. 2 Sep 66, 6p FTD-HT-66-93
Unedited rough draft trans. of Patent (USSR) 170 074, appl. 876073/26-25, 14 Jan 64.

Descriptors: (*Beams (Electromagnetic), *Deflection), Light, Instrumentation, Patents, USSR.

The object of the invention is a device for deflecting a light beam based on the electro-optical effect is different in that, to increase the speed of response, it is made in the form of an elongated rectilinear parallelepiped composed of two or more trigonal prisms that are made from electro-optical crystals; the light strikes the face of the parallelepiped whose lateral sides are covered with electrodes. The device described in paragraph 1 is different in that, to use it as the light valve in a laser, it is placed between the external mirrors of the laser, which are set at an angle to each other. (Author)
AD-643 710 HC$3.00 MF$0.65

EFFECT OF THE PLOTTING PARAMETER 'k' UPON LIGHT-SCATTERING RESULTS,
Polytechnic Inst. of Brooklyn, N. Y.
Michel Boeul, and Frederick Eirich. Oct 66, 81p
PIBAL-913
Contract Nonr-832 (32)

Descriptors: (*Light, Scattering), Molecules, Polynomials, Mathematical prediction, Least squares method, Solutions, Polymers, Errors, Optimization.

The optimization of the Zimm grid fit, as applied to the scattering of light from dilute polymer solutions, is discussed as a function of the plotting parameter 'k'. The characteristic parameters of the polymer and of its solution are relatively insensitive to the choice of 'k'; however, it is shown by a detailed error analysis, that a theoretically predictable value of 'k' minimizes the ratio of a function of error of the independent variable (a linear combination of the concentration and of a function of the scattering angle) to the same function of error of the dependent variable (the reciprocal intensity function). Optimal fit is obtained by choosing a value of the plotting parameter 'k' such that, on the average, the error committed on the independent variable is less than one percent of that committed on the dependent variable. It is thus shown that 'k' is not arbitrary, but that a predictable value can optimize the fit of the grid. (Author)
AD-643 718 HC$3.00 MF$0.65

TECHNIQUES FOR THE MEASUREMENT OF AIRGLOW AND AURORA IN THE INFRARED.
Interim rept.,
Utah State Univ., Logan. Electro-Dynamics Lab.
E. Ray Huppi. 1 Jul 66, 36p Scientific-5
AFCRL-66-668
Contract AF 19 (628)-251

Descriptors: (*Airglow, Infrared equipment), (*Aurorae, Infrared equipment), Sky brightness, Night sky, Upper atmosphere, Infrared research, Interferometers, Radiometers, Spectrum analyzers, Spectra (Infrared).

Two systems designed to enable the spectral measurement of the airglow in the 2 to 4 micron region have been developed. Both systems are designed for use in high-altitude aircraft. This eliminates the problem of strong thermal emission of the lower atmosphere which is encountered when making airglow measurements in the 2 to 4 micron region from the ground. In the first system the entire measurement apparatus, including the interferometer-spectrometer, is cooled in order to eliminate unwanted thermal emission. The second system incorporates the use of a cold chopper mounted outside the aircraft. This technique allows the interferometer-spectrometer to be maintained at normal temperatures.
AD-643 911 HC$3.00 MF$0.65

HIGH RESOLUTION ULTRAVIOLET SPECTRAL STUDY OF THE AURORA IN ASSOCIATION WITH SATELLITE EXPERIMENT.
Stanford Research Inst., Menlo Park, Calif.
For primary bibliographic entry see Field 4A.
AD-643 918 HC$3.00 MF$0.65

THE THEORY OF INFRARED ABSORPTION IN CRYSTALS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.

V. Kashcheev. 7 Oct 66, 17p FTD-HT-66-210
Unedited rough draft trans. of Akademiya Nauk Latviiskoi SSR, Riga. Izvestiya, n11 (196) p63-71

Descriptors: (*Crystals, Spectra (Infrared)), (*Infrared radiation, Absorption spectrum), Crystal lattices, Oscillation, Equations of motion, Green's function, Quantum statistics, USSR.

Consideration is given to the infrared absorption spectrum of ionic crystals due to the cubical anharmonism of lattice oscillations.
AD-644 007 HC$3.00 MF$0.65

ON THE CHARACTERISTICS OF INDUCED COMBINED DISPERSION IN BENZENE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. O. Broude, and L. P. Vilchynska. 27 Sep 66, 6p FTD-HT-66-174
TT-67-60297
Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v9 n9 p1031-32 1964.

Descriptors: (*Benzene, *Optical phenomena), (*Coherent radiation, Scattering), Lasers, Oscillation, Intensity, Resonators, Excitation, USSR.

An induction combination dispersion was obtained in purified benzene, which was contained in the resonator of a ruby laser, and the characteristics of its origin were investigated.
AD-644 009 HC$3.00 MF$0.65

INTERMOLECULAR REACTION AND DISPLACEMENTS OF OSCILLATION FREQUENCIES OF MOLECULES IN COMBINED DIFFUSION SPECTRAS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. L. Babych, and I. I. Kondilenko. 18 Aug 66, 6p FTD-HT-66-171
TT-67-60298
Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR), v8 n11 p1270-71 1963.

Descriptors: (*Solutions, *Optical phenomena), (*Carbon tetrachloride, Scattering), (*Nitrobenzenes, Scattering), Spectroscopy, Frequency, Concentration (Chemistry), Organic solvents, Toluenes, Methanols, Chemical bonds, Oscillation, Molecular association, USSR.

A report is given of a systematic investigation of the effects of concentration on the frequency displacement of the combined diffusion spectra of carbon tetrachloride in toluene and of nitrobenzene in methanol.
AD-644 010 HC$3.00 MF$0.65

OPTICAL AND LUMINESCENCE PROPERTIES OF MATERIALS UNDER HIGH PRESSURE.
Final rept., 1 May 65-30 Apr 66,
IIT Research Inst., Chicago, Ill. Technology Center.
S. S. Mitra. Nov 66, 152p IITRI-A6138
AFCRL-66-615
Contract AF 19 (628)-5144
Availability: Published in various journals.

Descriptors: (*Halides, Alkali metal compounds), (*Luminescence, Halides), (*Alkali metal compounds, Optical properties), High-pressure research, Spectra (Infrared), Mossbauer effect, Crystal lattices, Vibration, Phonons.

Optically active lattice vibrations of CdSe, ZnSe, BN, and BP were investigated by infrared reflection and transmission spectroscopy and Raman scattering. With the aid of data on temperature dependence of infrared transmission spectra, assignments for the critical point phonon modes in these crystals were made. A high-pressure diamond cell was successfully incorporated in a Perkin Elmer model 301 far-infrared spectrophotometer in conjunction with a 6X beam condenser. Lattice infrared spectra of a number of ionic solids, viz., KCl, NaNO3, Na2SO4, ZnSe, etc., were measured in transmission as a function of pressure (up to 100,000 atmospheres). Significant shifts of band positions (up to 20%) towards higher frequencies were noted in many cases. Using rigid and polarizable ion models and Born and Huang theory of long wavelength lattice modes, relations were obtained for the volume dependence of these modes in ionic crystals. Results of these calculations were applied to the data on temperature dependence of reststrahlen spectra of LiF and MgO. (Author)
AD-644 019 Not available from CFSTI.

OPTICAL RESONATOR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20I.
AD-644 043 HC$3.00 MF$0.65

INTEGRATED INTENSITY OF THE 6.3-MICRON BAND OF WATER VAPOR,
Technion - Israel Inst. of Tech., Haifa. Dept. of Physics.
For primary bibliographic entry see Field 7D.
AD-644 057 Not available from CFSTI.

TECHNOLOGY OF INFRARED RADIATION,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. B. Levitin. 29 Jul 66, 72p FTD-MT-65-133
TT-67-60310
Edited machine trans. of mono. Tekhnika Infrakrasnykh Izluchenii, Moscow, 1959 80p.

Descriptors: (*Infrared radiation, Scientific research), (*Industrial research, Infrared radiation), Blackbody radiation, Sources, Infrared photography, Infrared spectroscopy, Infrared equipment, Infrared optical materials.

The book acquaints radio amateurs with the bases of mechanics of infrared radiations which have at present various applications in science, the People's economy, military affairs, etc. It includes brief information about the nature of infrared radiations, their properties, methods of generation and reception, and also about basic applications in different branches of science and technology.
AD-644 071 HC$3.00 MF$0.65

THE MECHANICS OF SPHERULITE DEFORMATION.
Massachusetts Univ., Amherst. Polymer Research Inst.
For primary bibliographic entry see Field 20B.
AD-644 099 HC$3.00 MF$0.65

THE SCATTERING OF LIGHT BY DEFORMED THREE-DIMENSIONAL SPHERULITES.
Technical rept.,
Massachusetts Univ. Amherst. Polymer Research Inst.
J. J. van Aartsen, and Richard S. Stein. 1 Mar 66, 50p
ONR-TR-83
Contract Nonr-3357 (10)
See also AD-622 579.

Descriptors: (*Light, Scattering), (*Spheres, Light transmission), Deformation, Crystals, Theory.
Identifiers: Spherulites.

The report gives an account of some theoretical calculations, based upon two different 'affine transformation' models, as described previously. The preliminary results for two dimensional, disc-like spherulites are now extended to the three dimensional case and at the same time reorientation of the crystallites inside the spherulite is included. Although the calculations are carried out for the case of the stretching direction coinciding with the direction of polarization of the incident beam, the calculations are set up more generally and from the formulas derived in this report one can easily perform the calculations for the case that the stretching direction makes a certain angle psi with the polarization direction of the incident beam. The theory in this report is developed for non-ringed spherulites, that is, spherulites in which no regular helicoidal twisting of the crystallites around the spherulite radius occurs. We can, however, on the same basis develop equations for ringed spherulites. Light scattering intensity contours are presented for various combinations of the spherulitic parameters. (Author)
AD-644 105 HC$3.00 MF$0.65

EVALUATION OF A MINIATURIZED DOUBLE-FOCUSING MASS SPECTROMETER.
Spacelabs, Inc., Van Nuys, Calif.
W. H. Brigden. Nov 66, 195p NASA-CR-605
Contract NAS4-791

Descriptors: *Gas density, *In-flight monitoring, *Mass spectrometer, Accuracy, Carbon dioxide, Concentration, Density, Detection, Electronics, Evaluation, Gas, In-flight, Ion, Mass, Measurement, Monitor, Nitrogen, Operation, Oxygen, Sensitivity, Source, Spectrometer, Stability, Vacuum.

For abstract, see STAR 05 02.
N67-11341 HC$3.00 MF$0.65

AIMP OPTICAL ASPECT COVERAGE - THREE DIMENSIONAL APPROXIMATION.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
F. R. Chromey. Jun 66, 21p NASA-TM-X-55578, X-507-66-256

Descriptors: *Approximation method, *Imp, *Optical equipment, Approximation, Aspect, Axis, Computer, Coverage, Dimensional, Earth, Equipment, Method, Optical, Program, Spin, System, Telescope, Three, Vehicle.

For abstract, see STAR 05 02.
N67-11360 HC$3.00 MF$0.65

SIMULATION OF AN OPTICAL ASPECT SYSTEM.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
M. Lerman, and C. R. Newman. Mar 66, 20p NASA-TM-X-55588, X-507-66-309

Descriptors: *Sphere, *Telescope, Angle, Axis, Calculation, Computer, Cone, Equation, Optical, Plane, Program, Revolution, Spacecraft, Spin, Tangent, Terminator.

For abstract, see STAR 05 02.
N67-11366 HC$3.00 MF$0.65

MICROWAVE SPECTROSCOPIC IDENTIFICATION OF ATMOSPHERIC CONTAMINANTS STATUS REPORT, APR. 1 - SEP. 30, 1966.
Mississippi State Univ., State College. Dept. Of Physics.
G. E. Jones. Oct 66, 21p NASA-CR-79490
Contract NGR-25-001-008

Descriptors: *Microwave spectrum, *Molecular spectroscopy, *Trace contaminant, Atmospheric, Cabin, Contaminant, Detection, Gas, Identification, Inorganic, Microwave, Molecular, Organic, Space, Spectrometer, Spectroscopy, Spectrum, Trace.

For abstract, see STAR 05 02.
N67-11723 HC$3.00 MF$0.65

SUBMILLIMETER SATELLITE RADIOMETER FINAL ENGINEERING REPORT.
Advanced Technology Corp., Timonium, Md.
R. J. Bauer, M. Cohn, J. M. Cotton, Jr., L. E. Dickens, and J. W. Dozier. 29 Jul 66, 149p
NASA-CR-79739, REPT.-50,101-21
Contract NASW-1000

Descriptors: *Dicke type radiometer, *Solid state device, *Submillimeter wave, *Superheterodyne receiver, Astronomy, Communications, Device, Diode, Feasibility, Harmonic, Mixer, Noise, Oscillator, Receiver, Satellite, Sensitivity, Signal, Solid, Source, State, Submillimeter, Superheterodyne, Varactor, Wave.

For abstract, see STAR 05 02.
N67-12068 HC$3.00 MF$0.65

20G. PARTICLE ACCELERATORS

APPROXIMATE CALCULATION OF THE DYNAMICS OF ELECTRONS IN AN INJECTOR-BUNCHER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20H.
AD-643 981 HC$3.00 MF$0.65

WAVE GUIDE PROPERTIES OF A GAS-ELECTRON BEAM SYSTEM,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. B. Krasovytskyi. 27 Jun 66, 6p FTD-HT-66-172
Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v9 n6 p692-93 1964.

Descriptors: (*Plasma medium, Electron beams), USSR, Waveguides, Particle accelerators, Density, Mathematical analysis, Plasma oscillations.

Utilizing the great stresses of an electric field, which exist in focused light beams, for the acceleration of charged particles requires an examination of the system in which slow light waves can be realized. In this report one of the variants of such a system was investigated, namely: an electron beam, which passes through oscillator gases.
AD-644 015 HC$3.00 MF$0.65

PHOTOPRODUCTION OF NEUTRAL PIONS AT 500 DIVIDED BY ME V. SEARCH FOR A "RESONANT" P11 AND ETA CUSP EFFECT.
Comitato Nazionale Per L'Energia Nucleare, Frascati (Italy).
C. Bacci, C. Mencuccini, G. Penso, A. Reale, and G. Salvini. 25 Jul 66, 11p LNF-66/37
Its Nota Interna No. 330

Descriptors: *Photoproduction, *Pion, Coincidence, Cross section, Cusp, Electron, Energy, Isobar, Method, Neutral, Resonant, Synchrotron.

For abstract, see STAR 05 02.
N67-11760 HC$3.00 MF$0.65

THE OMNITRON A MULTIPURPOSE ACCELERATOR.
California Univ., Berkeley. Lawrence Radiation Lab.
Jul 66, 258p
Contract W-7405-eng-48

Descriptors: (*Particle accelerators, Ion beams), (*Ion beams, Ion accelerators).

For abstract, see NSA 20 24.
UCRL-16828 HC$3.00 MF$0.65

20H. PARTICLE PHYSICS

PROTON-NEUTRON MASS DIFFERENCE,
North Caroline Univ., Chapel Hill. Dept. of Physics.
Heinz Pagels. 24 Nov 65, 11p
AFOSR-66-2793
Grant AF-AFOSR-153-64
Availability: Published in Physical Review v144 n4 p1261-9 Apr 29 1966.

Descriptors: (*Protons, Atomic properties), (*Neutrons, Atomic properties), Magnetic moments, Nuclear reactions, Nuclear forces, Nuclear electric moments, Excitation, Nucleons, Nuclear energy.

The electromagnetic contributions to the masses of the nucleons were examined in terms of the graviton-nucleon vertex. Using the methods of sidewise dispersion relations, this vertex was considered as a function of the mass of one of the external nucleons, which enabled the expression of the contributions to delta M = M sub p-M sub n in terms of integrals over scattering amplitudes. Applying the hypothesis of threshold dominance, it was found that a simple explanation for the observed mass difference delta M = -1.3 MeV emerges. In the low-energy region to which attention was restricted, the only contributing states are the intermediate N gamma and N pi states. For the photon contributions the usual unsuccessful result delta M gamma approx. + 0.5 MeV was found as a consequence of the dominance of the Coulomb over the magnetic energy in the threshold region. However, in calculating the contribution of the nucleon mass shift back on itself from the N pi states of energy W, there is a term under the dispersion integral proportional to the difference of nucleon pole terms (W sq-M sub n)-/ (W sq-M sub p sq) approx = to -2M delta M/ (W sq - M sq) sq, implying a large contribution due to the enhancement at threshold W sq to M sq. Including this contribution we have delta M = + 0.5 MeV + 1.3 delta M or delta M approx = to -1.7 MeV, which suggests how the nucleon mass difference emerges in spite of the sign of the photon contribution. (Author)
AD-643 491 Not available from CFSTI.

ISOBARIC SPIN IN NUCLEAR PHYSICS,
Florida State Univ., Tallahassee. Dept. of Physics.
John D. Fox, and Donald Robson. 1966, 904p
AFOSR-66-2623
Grant AF-AFOSR-1063-66
Proceedings of the Conference on Isobaric Spin in Nuclear Physics, Tallahassee, Florida, March 17-19, 1966.
Availability: Academic Press Inc., 111 Fifth Avenue, New York, New York 10003.

Descriptors: (*Nuclear isobars, *Nuclear spins), Symposia, Reports, Nuclear physics.
Identifiers: Isobaric spin.

These proceedings present the most recent experimental and theoretical developments in the study of the role of isobaric spin in nuclear reactions and nuclear structure. In particular, the invited papers have been specifically organized and selected to serve as a systematic introduction to the subject. (Author)
AD-643 521 Not available from CFSTI.

STUDY OF EXCITED STATES OF MOLECULAR OXYGEN BY MOLECULAR BEAM MAGNETIC RESONANCE TECHNIQUES,
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
Gilbert O. Brink. Nov 66, 49p CAL-RM-2156-P-1
Contract DA-49-146-XZ-483

Descriptors: (*Molecular beams, Magnetic resonance), (*Detection, Sensitivity), Electron bombardment, Chemical reactions, Upper atmosphere, Charged particles, Plasma physics, Chemical properties, Oxygen.

The purpose of this program is to investigate the effect of metastable excited states of atoms and molecules on chemical reactions that are of importance in the upper atmosphere. The majority of laboratory studies of these reactions use flowing afterglow systems in which reactive species are produced in a discharge and then allowed to react with other species in a flowing afterglow. Since these systems are usually monitored optically, it is difficult to obtain information concerning long-lived excited species directly. Many of these species contain significant energy of excitation which can alter their chemical properties markedly as compared with those of their ground states. It is desirable, therefore, to have available an experimental technique that would allow a direct assessment of the importance of these metastable states. Such a technique is that of molecular beam magnetic resonance, which permits a direct sampling of the metastable states present in the reaction system. Its preliminary application to this problem is discussed in this report.
AD-643 526 HC$3.00 MF$0.65

THE PROBLEM OF WIDENING AND DISPLACING ENERGY LEVELS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20J.
AD-643 633 HC$3.00 MF$0.65

ANGLE AND CHANNEL DEPENDENCE OF RESONANCES IN e-He SCATTERING NEAR 60 eV.
National Bureau of Standards, Washington, D. C.
For primary bibliographic entry see Field 7D.
AD-643 805 Not available from CFSTI.

T EQUAL 3/2 LEVELS IN 17F,
California Inst. of Tech., Pasadena.
E. G. Adelberger, and C. A. Barnes. Oct 66, 8p
Contract Nonr-220 (47)
One of the Lemon Aid reprint series in Nuclear Physics.

Descriptors: (*Fluorine, *Nuclear energy levels), (*Nuclear spins, Fluorine), Excitation, Nitrogen, Ion bombardment, Neutron spectrum.

T = 3/2 levels in fluorine-17 were seen at excitation energies of 11.195, 12.544, and 13.055 MeV in the reaction 15N (3He,n). Angular distributions lead to spin assignments of 1/2- for the 11.195 MeV level, and 3/2- or 5/2- for the level at 12.544 MeV. (Author)
AD-643 811 HC$3.00 MF$0.65

MULTIPLE SCATTERING OF CHARGED PARTICLES,
California Inst. of Tech., Pasadena.
Jerry B. Marion, and Barbara A. Zimmerman. Oct 66, 25p
Contract Nonr-220 (47)

Descriptors: (*Charged particles, Nuclear scattering), (*Nuclear scattering, Numerical analysis), Theory, Approximation (Mathematics), Nuclear cross sections, Protons, Statistical distributions.

Numerical calculations were carried out for the multiple scattering of charged particles as described by the theories of Moliere and of Nigam, Sundaresan, and Wu (NSW). The NSW theory is the more accurate but the deviations from the older theory of Moliere are not great. An approximation to the NSW theory is given which is shown to be essentially indistinguishable from the complete NSW theory for the scattering of medium energy protons and which allows the construction of 'universal' angular distribution curves. A meth-

od is given which permits the rapid evaluation of the angle at which the angular distribution has decreased to 1/e of its value in the forward direction. (Author)
AD-643 812 HC$3.00 MF$0.65

THEORETICAL INVESTIGATIONS OF THE PENETRATION OF KILOVOLT IONS AND ATOMS IN SOLIDS.
Battelle Memorial Inst., Columbus, Ohio.
For primary bibliographic entry see Field 20L.
AD-643 834 HC$3.00 MF$0.65

CALCULATIONS OF ENERGY LOSS, RANGE, PATHLENGTH, STRAGGLING, MULTIPLE SCATTERING, AND THE PROBABILITY OF INELASTIC NUCLEAR COLLISIONS FOR 0.1- TO 1000-MEV PROTONS.
Technical rept., 1 Sep 64-1 May 66,
Air Force Weapons Lab., Kirtland AFB, N. Mex.
Joseph F. Janni. Sep 66, 447p AFWL-TR-65-150

Descriptors: (*Protons, Kinetic energy), (*Inelastic scattering, Protons), Excitation, Ionization potentials, Proton scattering, Shielding, Proton beams, Polarization, Proton accelerators, Probability.

Theoretical calculations have been made of the mean energy loss, pathlength, range, multiple scattering, and pathlength straggling of protons in 74 materials, including materials regularly used in radiation shielding and dosimetry. Emphasis has been placed on obtaining accurate results, especially for heavy materials and protons of very low energy. Values of the energy loss between 0.1 and 1.0 Mev were obtained by smoothing and interpolating experimental information. Above 1.0 Mev, the Bethe equation with all the necessary shell corrections has been used. The polarization effect has been calculated in detail for each material. Ranges have been obtained from the pathlengths by use of detailed multiple coulomb scattering theory. Comprehensive tabulations of the range straggling and multiple scattering have been presented for each of the materials. The energy loss and range calculations have been compared with the available experimental data and the mean deviation is usually within 1.0 percent. Deviation rarely exceeds the estimated error of the experimental data. The theoretical approach is also discussed in detail, and the method used to obtain the K, L, M, N, and O shell corrections is presented. A first-order correction has been made which compensates for the molecular binding effects occurring in compounds. The probability that a proton will undergo an inelastic nuclear interaction throughout its entire pathlength is also tabulated.
AD-643 837 HC$3.00 MF$0.65

BROKEN U (3) SYMMETRY AND SEMILEPTONIC WEAK INTERACTIONS.
Harvard Univ., Cambridge, Mass. Dept. of Physics.
For primary bibliographic entry see Field 20J.
AD-643 839 Not available from CFSTI.

MUON PAIR PRODUCTION IN STRONG INTERACTIONS.
Interim rept.,
Stanford Univ., Calif. Dept. of Physics.
R. J. Oakes. 11 Feb 66, 9p
AFOSR-66-2456
Contract AF 49 (638)-1389
Availability: Published in Il Nuovo Cimento ser10 v44 p440-7 Jul 21 1966.

Descriptors: (*Muons, *Pair production), Nuclear reactions, Decay schemes, Protons, Polarization, Interactions.
Identifiers: Meson exchange, Strong interactions.

The general analysis of positive-muon negative-muon (or electron positron) pair production from any unpolarized initial state of strongly interacting particles is given to lowest order in the electromagnetic interaction. The process is completely described by five real form factors that are simply related to the density matrix elements for the production of a virtual photon which then decays into the pair. The angular distribution of the positive-muon negative-muon pairs in their center of momentum and their polarizations are computed in terms of the form factors. By measuring the angular distribution and polarizations of the pair one can determine all five form factors and thereby investigate the structure of the production process. Finally, some peripheral-meson-exchange models of the process are considered. (Author)
AD-643 841 Not available from CFSTI.

p-3H AND n-3He FINAL-STATE INTERACTIONS IN d+3H AND d+3He REACTIONS,
Stanford Univ., Calif. Inst. of Theoretical Physics.
D. U. L. Yu, and W. E. Meyerhof. 13 Dec 65, 20p
AFOSR-66-2348
Contract AF 49 (638)-1389
Availability: Published in Nuclear Physics v80 p481-99 1966.

Descriptors: (*Proton reactions, Decay schemes), (*Neutron spectrum, Decay schemes), (*Decay schemes, Approximation (Mathematics)), Helium, Deuteron reactions, Hydrogen, Alpha particles, Interactions, Wave functions, Phase shift, Nuclear energy levels, Parity, Nuclear reactions, Nuclear cross sections, Particle spectra.
Identifiers: Born approximation, Proton spectrum.

A modified Born approximation calculation was made in order to explain the high energy proton spectra from the three-body breakup of the d+3He reaction and the high energy neutron spectra from the three-body breakup of the d + 3He reaction. The modification takes into account the p-3He and n-3He final-state interactions by means of the so-called factored wave function method. Effects of the Pauli principle on the breakup reaction are also considered. Complex p + 3H and n + 3He phase shifts are used which had been derived from a prior analysis of the 3H (p,p), 3H (p,n) and 3He (n,n) reactions. The present analysis shows that the main features of the energy and (forward) angular distributions of the high-energy nucleons from the three-body breakup of the d + 3He and d + 3H reactions can be reproduced by our simple approximation. The final-state interactions in the 4He system are consistent with experimental states in 4He peaking near 20.1 and 22 MeV excitation energy. The former state was previously shown by Werntz to be 0+. The latter state has negative parity. (Author)
AD-643 842 Not available from CFSTI.

TRANSVERSE INELASTIC FORM FACTORS IN 12C FROM A CONTINUUM MODEL.
Stanford Univ., Calif. Dept. of Physics.
For primary bibliographic entry see Field 20J.
AD-643 848 Not available from CFSTI.

THE ELECTRON AND POSITRON ENERGY DISTRIBUTION FROM PROTON-ANTIPROTON ANNIHILATION AT REST,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
B. Renner. 8 Sep 65, 8p
AFOSR-66-1875
Grant AF-EOAR-79-63
Availability: Published in Mon Not R astr Soc v133 p197-203 1966.

Descriptors: (*Annihilation reactions, Energy), (*Protons, Annihilation reactions), (*Electrons, Energy), (*Positrons, Energy), Decay schemes, Pions, Muons, Neutrinos, Momentum, Distribution, Great Britain.
Identifiers: Antimatter.

From measurements of the charged pion energy distribution and multiplicities made by Ndili Westwood and Forson the multiplicities and energy distributions of electrons and positrons arising through the decays 'positive- and negative-pion to positive- and negative-muon + neutrino,' and 'positive- and negative-muon to electron and positron + neutrino + antineutrino' are calculated, and the effect of other channels is estimated. This work is supposed to be of interest for considering antimatter in the universe. (Author)
AD-643 885 Not available from CFSTI.

MEASURING THE VELOCITIES OF PARTICLES IN A ROTATING PLASMA THROUGH A FABRY-PEROT INTERFEROMETER WITH PHOTOELECTRIC RECORDING.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. A. Odintsova, and Ye. P. Vaulin. 27 Sep 66, 12p FTD-HT-66-522
Unedited rough draft trans. of Zhurnal Prikladnoi Spektroskopii (USSR) v3 n2 p105-08 1965.

Descriptors: (*Plasma accelerators, Rotation), (*Charged particles, Plasma accelerators), Velocity, Motion, Interferometers, Recording systems, Photoelectric effect, Line spectrum, Gas discharges, Cyclotrons, Photographic recording systems, Magnetic fields, Argon, Interference.

The velocities in rotational motion of atoms and ions in a plasma device of the homopolar type that is operating in the stationary regime were determined fr tm the Doppler shift of the spectral lines. We used a Fabry-Perot interferometer with both photoelectric and photographic recording of the interference pattern. A comparison of both methods shows that in problems of this type photoelectric recording has significant advantages over photographic, particularly when the contours of the lines are asymmetric.
AD-643 903 HC$3.00 MF$0.65

SOME REMARKS ON THE RENORMALIZATION OF THE VECTOR AND AXIAL-VECTOR CABIBBO ANGLES,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
For primary bibliographic entry see Field 20J.
AD-643 917 Not available from CFSTI.

REFRACTION OF ELECTRON BEAMS BY INTENSE ELECTROMAGNETIC WAVES,
Imperial Coll. of Science and Technology, London (England). Dept. of Physics.
T. W. B. Kibble. 29 Apr 66, 4p
AFOSR-66-2011
Grant AF-EOAR-46-64
Availability: Published in Physical Review Letters v16 n23 p1054-6 Jun 6 1966.

Descriptors: (*Electron beams, Refraction), Electromagnetic waves, Electron optics, Equations of motion.

The article considers an electron moving in an oscillating electromagnetic field whose amplitude is a slowly varying function of space and time and investigates the averaged motion of the electron, the analog of the guiding-center drift of a particle in a magnetic field.
AD-643 945 Not available from CFSTI.

ON THE EXISTENCE OF AXIAL VECTOR MESONS,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
For primary bibliographic entry see Field 20J.
AD-643 947 Not available from CFSTI.

Group 20H — Particle physics

THE INTERACTION OF NEUTRONS WITH URANIUM-235 NUCLEI IN THE ENERGY REGION OF 0.002-30 KEV,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Wang Shih-Ti, and Wang Yung-Ch'ang. 12 Sep 66, 22p FTD-HT-66-338
TT-67-60265
Unedited rough draft trans. of Konferentsiyu po Fizike i Khimii Deleniya v Zaltsburge, Austriya, 22-26 Marta 1965. Predstavleno, Dubna, 1965 25p.

Descriptors: (*Uranium, *Neutron reactions), (*Nuclear energy levels, Uranium), (*Nuclear cross sections, Uranium), Fission, Neutron cross sections, Neutron capture, Radiation measurement systems, Fission products, USSR.

Work is described which used a new experimental method to investigate the interaction of neutrons with U-235 nuclei in the region 0.002-30 kev to obtain the parameters of the levels and to determine the average cross sections of fission and radiation capture. (Author)
AD-643 958 HC$3.00 MF$0.65

APPROXIMATE CALCULATION OF THE DYNAMICS OF ELECTRONS IN AN INJECTOR-BUNCHER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. F. Gass. 21 Nov 66, 18p FTD-MT-65-488
Edited machine trans. of Inzhenerno-Fizicheskii Institut, Moscow. Uskoriteli (USSR) n5 p45-54 1963.

Descriptors: (*Electrons, Equations of motion), Dynamics, USSR, Oscillation, Resonators, Numerical analysis, Velocity, Particle accelerator components.

The injector-buncher consists of two cylindrical resonators located side-by-side. Oscillations of type E sub 010 are excited in the resonators. A cold-cathode (field-emission cathode) is located in the first resonator. A sharp pulse of current occurs during one complete cycle of high-frequency oscillation. The paper proves that by using certain assumptions during the solution of the equations of motion of the electrons in the resonators, a qualitative and quantitative study can be made of the bunching properties of the considered device without resorting to numerical integration of the equation of motion. (Author)
AD-643 981 HC$3.00 MF$0.65

SUM RULES FOR STRONG INTERACTIONS,
Torino Univ. (Italy). Istituto di Fisica.
For primary bibliographic entry see Field 20J.
AD-644 089 Not available from CFSTI.

A NEW APPROACH TO SCATTERING BY SINGULAR POTENTIALS.
Torino Univ. (Italy). Istituto di Fisica.
For primary bibliographic entry see Field 20J.
AD-644 091 Not available from CFSTI.

NUCLEON MAGNETIC MOMENTS AND PHOTOPRODUCTION SUM RULES.
Torino Univ. (Italy). Istituto di Fisica.
For primary bibliographic entry see Field 20J.
AD-644 092 Not available from CFSTI.

REDUCED-AMPLITUDE EQUATION FOR TWO- AND THREE-PARTICLE SYSTEMS - II,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
For primary bibliographic entry see Field 20J.
AD-644 134 Not available from CFSTI.

REDUCED-AMPLITUDE EQUATIONS FOR TWO- AND THREE-PARTICLE SYSTEMS - I,
Cambridge Univ. (England). Dept. of Applied Mathematics and Physics.
For primary bibliographic entry see Field 20J.
AD-644 135 Not available from CFSTI.

THE DISCONTINUITY OF A GENERAL FEYNMAN INTEGRAL AND REGGE POLES IN PERTURBATION THEORY,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
For primary bibliographic entry see Field 20J.
AD-644 136 Not available from CFSTI.

LECTURES ON REGGE POLES AND THEIR PHENOMENOLOGICAL APPLICATION IN HIGH-ENERGY PHYSICS,
Argonne National Lab., Ill.
R. C. Arnold. Feb 66, 70p
Contract W-31-109-eng-38

Descriptors: (*Potential theory, Integral equations), (*Nuclear scattering, Potential theory).

For abstract, see NSA 20 24.
ANL-7173 HC$3.00 MF$0.65

CALCULATIONS OF NEUTRON CROSS SECTIONS USING A LOCAL OPTICAL POTENTIAL WITH AVERAGE PARAMETERS,
Los Alamos Scientific Lab., N. Mex.
Ferne P. Agee, and Louis Rosen. Jul 66, 367p
Contract W-7405-eng-36

Descriptors: (*Neutron cross sections, Elastic scattering), (*Elastic scattering, Nuclear energy).

For abstract, see NSA 20 24.
LA-3538-Vol-1 HC$3.00 MF$0.65

CALCULATIONS OF NEUTRON CROSS SECTIONS USING A LOCAL OPTICAL POTENTIAL WITH AVERAGE PARAMETERS,
Los Alamos Scientific Lab., N. Mex.
Ferne P. Agee, and Louis Rosen. Jul 66, 351p
Contract W-7405-eng-36

Descriptors: (*Neutron cross sections, Nuclear energy), (*Nuclear energy levels, Neutron cross sections).

For abstract, see NSA 20 24.
LA-3538-Vol-2 HC$3.00 MF$0.65

NEUTRON CAPTURE REACTIONS AND STELLAR NUCLEOSYNTHESIS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
J. H. Gibbons. 20 Oct 66, 30p NASA-TM-X-53527

Descriptors: *Heavy element, *Neutron cross section, *Nucleosynthesis, *Stellar evolution, Abundance, Beta, Capture, Cross section, Decay, Element, Evolution, Formation, Heavy, Neutron, Nuclide, Physics, Reaction, Stability, Stellar, Structure.

For abstract, see STAR 05 02.
N67-11353 HC$3.00 MF$0.65

POSITRON ANNIHILATION IN HELIUM.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
R. J. Drachman. May 66, 22p NASA-TM-X-55574, X-641-66-204

Descriptors: *Adiabatic equation, *Helium, *Positron annihilation, *Scattering function, Adiabat, Annihilation, Dirac equation, Elastic, Electron, Energy, Equation, Excitation, Function, Ion, Model, Positron, Radiation, Rate, Scattering, Ultraviolet, Wave.

For abstract, see STAR 05 02.
N67-11356 HC$3.00 MF$0.65

RADIOACTIVE NUCLEI PRODUCTION FROM RELATIVELY ABUNDANT NATURAL ELEMENTS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
R. J. Janda. Jul 66, 14p NASA-TM-X-55577, X-716-66-248

Descriptors: *Particle production, *Radioactive particle, *Table, Abundance, Accelerator, Beam, Decay, Element, Energy, Half-life, Hazard, Nucleus, Particle, Production, Radioactivity, Reaction, Safety, Threshold.

For abstract, see STAR 05 02.
N67-11359 HC$3.00 MF$0.65

EXCITATION OF HYDROGEN MOLECULES BY ELECTRON IMPACT. II - EXCITATION TO D/3PPI 1PIU/ STATE.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
S. P. Khare. Jul 66, 9p NASA-TM-X-55589, X-640-66-312

Descriptors: *Electron impact, *Excitation, *Hydrogen, Born approximation, Cross section, Electron, Energy, Function, Impact, Molecule, Oscillator, Strength, Wave.

For abstract, see STAR 05 02.
N67-11367 HC$3.00 MF$0.65

PROTON EVENTS IN THE MAGNETOSPHERE ASSOCIATED WITH MAGNETIC BAYS.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A. Konradi. Jul 66, 28p NASA-TM-X-55594, X-611-66-332

Descriptors: *Magnetic effect, *Magnetosphere, *Proton density, Aurora, Bay, Density, Detector, Effect, Electron, Event, Flux, Ion, Magnetic, Negative, Particle, Proton, Radiation, Space, Zone.

For abstract, see STAR 05 02.
N67-11371 HC$3.00 MF$0.65

THE ENERGY SPECTRUM OF COSMIC RAY HEAVY NUCLEI OF CHARGE Z GREATER THAN 10 DURING A SOLAR QUIET TIME IN JULY 1961.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
N. Durgaprasad. Aug 66, 31p NASA-TM-X-55602, X-611-66-366

Descriptors: *Cosmic ray, *Energy spectrum, *Heavy nucleus, Activity, Charge, Cosmic, Density, Emulsion, Energy, Heavy, Low energy, Nucleus, Quiet, Ray, Solar, Spectrum, Time.

For abstract, see STAR 05 02.
N67-11376 HC$3.00 MF$0.65

OBSERVATION OF ABOUT 500 KE V PROTONS IN INTERPLANETARY SPACE WITH MARINER IV.
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
S. M. Krimigis, and J. A. Van Allen. Dec 65, 14p NASA-CR-79364
Grant NSG-233-62, Contract JPL-950613
Its Rept.-65-45

Descriptors: *Mariner iv space probe, *Proton density, *Satellite observation, Density, Detector, Flight, Interplanetary, Low energy, Magnetosphere, Observation, Proton, Satellite, Solar, Solid, Space, State, Wind.

For abstract, see STAR 05 02.
N67-11688 HC$3.00 MF$0.65

INITIAL OBSERVATIONS OF LOW-ENERGY ELECTRONS IN THE EARTH'S MAGNETOSPHERE WITH OGO 3.
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
L. A. Frank. Aug 66, 47p NASA-CR-79387
Contracts NAS5-2054, NONR-1509/06/
Its Rept.-66-39

Descriptors: *Electron, *Magnetosphere, *Ogo, Analyzer, Aurora, Density, Earth, Electrostatic, Energy, Low energy, Radiation, Spectrum, Van allen belt.

For abstract, see STAR 05 02.
N67-11697 HC$3.00 MF$0.65

PHOTOPRODUCTION OF NEUTRAL PIONS AT 500 DIVIDED BY ME V. SEARCH FOR A "RESONANT" PI1 AND ETA CUSP EFFECT.
Comitato Nazionale Per L Energia Nucleare, Frascati (Italy).
For primary bibliographic entry see Field 20G.
For abstract, see STAR 05 02.
N67-11760 HC$3.00 MF$0.65

DATA COMPILATION AND EVALUATION OF SPACE SHIELDING PROBLEMS. RADIATION HAZARDS IN SPACE, VOLUME III.
Lockheed Nuclear Products, Marietta, Ga.
C. W. Hill, W. B. Ritchie, and K. M. Simpson, Jr.. Apr 66, 182p NASA-CR-76511, ER-7777
Contract NAS8-11164

Descriptors: *Interplanetary space, *Radiation hazard, *Shielding, Alpha, Computer, Earth, Electron, Flux, Hazard, Interplanetary, Mars, Particle, Program, Proton, Radiation, Solar, Space.

For abstract, see STAR 05 02.
N67-11966 HC$3.00 MF$0.65

ELECTRON COLLISION CROSS SECTIONS IN METAL VAPORS FINAL REPORT.
Westinghouse Electric Corp., Pittsburgh, Pa. Research Labs.
J. F. Nolan. 23 Sep 66, 30p NASA-CR-72053
Contract NAS3-7930

Descriptors: *Electron collision, *Metal vapor, Collision, Cross section, Density, Electric, Electron, Excitation, Helium, Metal, Mixture, Potassium, Pressure, Vapor.

For abstract, see STAR 05 02.
N67-12094 HC$3.00 MF$0.65

THE DYNAMICAL STATE OF THE INTERSTELLAR GAS AND FIELD. II - TURBULENCE AND ENHANCED DIFFUSION.
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
E. N. Parker. Oct 66, 83p NASA-CR-80133, EFINS-66-96
Grant NSG-96-60

Descriptors: *Cosmic ray, *Dynamic stability, *Galactic magnetic field, *Interstellar gas, Cloud, Cosmic, Diffusion, Dynamic, Energy, Enhancement, Field, Galaxy, Gas, Instability, Interstellar, Magnetic, Ray, Stability, Turbulence.

For abstract, see STAR 05 02.
N67-12168 HC$3.00 MF$0.65

AN ANGULAR CORRELATION TEST OF TIME REVERSAL INVARIANCE.
Western Reserve Univ., Cleveland, Ohio. Dept. Of Physics.
K. J. Casper, and R. A. Kuebbing. 1965, 7p
NASA-CR-80122
Grant NSG-655

Descriptors: *Angular correlation, *Gamma radiation, *Invariance, *Time function, Angular, Cascade, Coefficient, Correlation, Electromagnetic, Experiment, Function, Gamma, Interaction, Legendre polynomial, Measurement, Radiation, Time.

For abstract, see STAR 05 02.
N67-12178 HC$3.00 MF$0.65

INFRARED LINE EMISSION FROM PLANETARY NEBULAE. I - GENERAL THEORY.
California Univ., San Diego. Dept. Of Physics.
T. N. Delmer, R. J. Gould, and W. Ramsay. 1966, 59p NASA-CR-80124
Grant NSG-357

Descriptors: *Infrared radiation, *Line spectrum, *Planetary nebula, Collision, Dipole, Helium, Infrared, Ion, Line, Magnetic, Nebula, Planetary, Radiation, Recombination, Spectrum, Theory, Transition.

For abstract, see STAR 05 02.
N67-12179 HC$3.00 MF$0.65

EFFECT OF RADIATION ATTENTUATION UPON THE MOTION OF A RELATIVISTIC PARTICLE IN A UNIFORM FIELD.
Vliyaniye Radiatsionnogo Tormozheniya Na Dvizheniye Relyativistkoy Chastitsy V Odnorodnom Magnitnom Pole
Consultants And Designers, Inc., Arlington, Va.
G. E. Gernet. 20 May 66, 5p NASA-CR-80179, ST-PF-10490
Contract NAS5-9299
Transl. Into English From Dokl. Akad. Nauk Sssr, Fizika (Moscow), V. 168, No. 1, 1966 P 63-64

Descriptors: *Magnetic field, *Particle motion, *Radiation absorption, *Relativistic particle, *Uniform flow, Absorption, Attenuation, Field, Flow, Magnetic, Motion, Particle, Radiation, Relative, Theory, Transverse, U.S.S.R., Uniform, Velocity.

For abstract, see STAR 05 02.
N67-12203 HC$3.00 MF$0.65

BEHAVIOR OF RADIATION BELTS ANOMALOUS COSMIC RADIONOISE ABSORPTION IN THE AURORA ZONE DURING THE MAGNETIC STORMS OF 12-14 AND 20-21 FEBRUARY 1964.
Povedeniye Radiatsionnykh Poyasov I Anomal'noye Pogloshcheniye Kosmicheskogo Radioshuma V Zone Polyarnykh Siyaniy Vo Vremya Magnitnykh Bur' 12-14 Fevralya I 20-21 Fevralya 1964 G
Consultants And Designers, Inc., Arlington, Va.
V. M. Driatskiy, S. N. Kuznetsov, V. G. Stolpovskiy, and S. N. Vernov. 12 Apr 66, 13p NASA-CR-80176, ST-PF-GM-10473
Contract NAS5-9299
Transl. Into English From Geomagnetizm I Aeronomiya (Moscow), V. 6, No. 1, 1966 P 3-10

Descriptors: *Auroral zone, *Cosmic noise, *Geomagnetic storm, *Ionospheric absorption, *Outer radiation belt, Absorption, Artificial, Aurora, Belt, Cosmic, Earth, Electron, Flux, Geomagnetic, Intensity, Ionospheric, Noise, Observation, Outer, Radiation, Satellite, Storm, U.S.S.R., Zone.

For abstract, see STAR 05 02.
N67-12206 HC$3.00 MF$0.65

STUDY OF THE SOFT CORPUSCULAR RADIATION ON THE AMS " LUNA-10".
Izucheniye Myagkoy Korpuskulyarnoy Radiatsii Na Sputnike Luny "luna 10"
Volt Technical Corp., Washington, D. C.
N. L. Grigorov, V. L. Maduyev, S. L. Mandelshtam, N. F. Pisarenko, and I. A. Savenko. 29 Oct 66, 5p NASA-CR-80174, ST-LPS-PF-10528
Contract NAS5-12487
Transl. Into English From Dokl. Akad. Nauk Sssr, Geofizika (Moscow), V. 170, No. 3, 1966 P 567-569

Descriptors: *Corpuscular radiation, *Lunar radiation, *Radiation measurement, *Satellite, Artificial, Corpuscular, Counter, Discharge, Earth, Field, Gas, Instrumentation, Intensity, Lunar, Magnetic, Magnetosphere, Measurement, Radiation, Soft, Tail, U.S.S.R..

For abstract, see STAR 05 02.
N67-12208 HC$3.00 MF$0.65

MEASUREMENT OF THE CHARGED SPLASH AND RE-ENTRANT ALBEDO OF THE COSMIC RADIATION.
Chicago Univ., Ill. Enrico Fermi Inst. For Nuclear Studies.
S. D. Verma. Jul 66, 38p NASA-CR-79516, EFINS-66-71
Grant NSG-144-61

Descriptors: *Balloon sounding, *Cosmic ray albedo, *Electron flux, *Proton energy, Albedo, Charge, Cosmic, Electron, Energy, Flux, High altitude, Kinetics, Measurement, Proton, Ray, Reentry, Spectrum, Splash.

For abstract, see STAR 05 02.
N67-12219 HC$3.00 MF$0.65

A PARTIAL WAVE EXPANSION IN SPHEROIDAL COORDINATES FOR DIATOMIC MOLECULES.
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
W. B. Brown, and R. B. Hake. 25 Jul 66, 23p NASA-CR-78974, WIS-TCI-177
Grant NSG-275-62

Descriptors: *Coordinate system, *Diatomic molecule, *Expansion wave, *Prolate spheroid function, Approximation, Coordinate, Diatomic, Electron, Expansion, Function, Molecule, One, Partial, Prolate, Property, Spheroid, Structure, System, Theory, Two, Wave.

For abstract, see STAR 05 02.
N67-12232 HC$3.00 MF$0.65

INVESTIGATION OF COSMIC RADIATION ON THE AMS " LUNA-10".
Issledovaniye Kosmicheskogo Izlucheniya Na Iskusstvennom Sputnike Luna-10
Volt Technical Corp., Washington, D. C.
N. L. Grigorov, V. L. Maduyev, N. F. Pisarenko, and I. A. Savenko. 25 Oct 66, 4p NASA-CR-80172, ST-LPS-CR-10526
Contract NAS5-12487
Transl. Into English From Dokl. Akad. Nauk Sssr, Geofizika (Moscow), V. 170, No. 3, 1966 P 565-566

Descriptors: *Lunar satellite, *Primary cosmic radiation, *Radiation measurement, Activity, Cosmic, Flux, Lunar, Measurement, Primary, Radiation, Satellite, Solar, Spacecraft.

For abstract, see STAR 05 02.
N67-12238 HC$3.00 MF$0.65

COMPTON EFFECT ON RELATIVISTIC ELECTRONS IN THE ATMOSPHERE OF THE SUN.
O Kompton Effekte Na Relativistskikh Elektronakh V Atmosfere Solntsa

Group 20H—Particle physics

Consultants And Designers, Inc., Arlington, Va.
A. A. Korchak, and YU. B.Ponomarenko. 29 Aug 66, 10p NASA-CR-80166, ST-PF-CR-SP-10511
Contract NAS5-9299
Transl. Into English From Geomagnetizm I Aeronomiya (Moscow), V. 4, No. 3, 1966 P 417-423

Descriptors: *Compton effect, *Relativistic particle, *Solar atmosphere, Atmosphere, Cross section, Emission, Frequency, Heliography, Particle, Photon, Propagation, Relativity, Solar.

For abstract, see STAR 05 02.
N67-12241 HC$3.00 MF$0.65

OBSERVATION OF A DIFFUSION WAVE OF RELATIVISTIC ELECTRONS IN THE OUTER RADIATION BELT.
Hablyudeniye Diffusionnoy Volny Relyativistskikh Elektronov Vo Vneshnem Radiatsionnom Poyase
Volt Technical Corp., Washington, D. C.
I. A. Savenko, P. I. Shavrin, M. V. Teltsov, and S. N. Vernov. 16 Sep 66, 7p NASA-CR-80167, ST-PF-GM-10514
Contract NAS5-12487
Transl. Into English From Geomagnetizm I Aeronomiya (Moscow), V. 6, No. 4, 1966 P 661-663

Descriptors: *Cosmos satellite, *Electron diffusion, *Outer radiation belt, Belt, Diffusion, Electron, Estimate, Intensity, Outer, Proton, Radiation, Registration, Relativity, Satellite, Variation, Velocity, Wave.

For abstract, see STAR 05 02.
N67-12242 HC$3.00 MF$0.65

SEVERAL OBSERVATIONS OF LOW-ENERGY PROTONS AND ELECTRONS IN THE EARTH'S MAGNETOSPHERE WITH OGO 3.
State Univ. Of Iowa, Iowa City. Dept. Of Physics And Astronomy.
L. A. Frank. Nov 66, 55p NASA-CR-80113, REPT.-66-48
Contracts NAS5-2054, NONR-1509/06/

Descriptors: *Electron, *Magnetosphere, *Ogoc, *Proton, *Satellite observation, Charge, Current, Differential, Earth, Energy, Intensity, Low energy, Magnetic, Observation, Particle, Radiation, Ring, Satellite, Simultaneous, Spectrum, Spike, Tail, Terrestrial, Trapping, Zone.

For abstract, see STAR 05 02.
N67-12262 HC$3.00 MF$0.65

ACTIFK A GENERAL ANALYSIS CODE FOR 05R,
Oak Ridge National Lab., Tenn.
F. B. K. Kam, and K. D. Franz. Sep 66, 142p
Contract W-7405-eng-26

Descriptors: (*Neutron transport theory, Programming (Computers)), (*Monte Carlo method, Neutron transport theory).

For abstract, see NSA 20 24.
ORNL-3856 HC$3.00 MF$0.65

ABSOLUTE EFFICIENCY MEASUREMENTS OF NE-213 ORGANIC PHOSPHORS FOR DETECTING 14,4- AND 2.6-MEV NEUTRONS,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 20 24.
ORNL-3893 HC$3.00 MF$0.65

NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 31, 1966.
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18D.
For abstract, see NSA 20 24.
ORNL-3973 Vol 2 HC$3.00 MF$0.65

REVIEW OF RADIOISOTOPES PROGRAM, 1965,
Oak Ridge National Lab., Tenn.
For primary bibliographic entry see Field 18B.
For abstract, see NSA 20 24.
ORNL-4013 HC$3.00 MF$0.65

NEUTRON-PROTON ELASTIC SCATTERING FROM 1 TO 6,3 GEV,
Stanford Linear Accelerator Center, Calif.
M. N. Kreisler. Jul 66, 122p
Contract AT (04-3)-515

Descriptors: (*Neutrons, Elastic scattering), (*Elastic scattering, Protons).

For abstract, see NSA 20 24.
SLAC-66 HC$3.00 MF$0.65

FORTRAN PROGRAM KINE: CALCULATING KINEMATICAL AND DYNAMICAL QUANTITIES FOR PARTICLE INTERACTIONS AND DECAYS,
Lawrence Radiation Lab., Univ. of California, Berkeley.
W. Peter Trower. 1 Sep 66, 19p
Contract W-7405-eng-48

Descriptors: (*Nuclear particles, Kinetic energy), (*Radioactive decay, Nuclear particles).

For abstract, see NSA 20 24.
UCRL-11650-Rev. HC$3.00 MF$0.65

HIGH-ENERGY PARTICLE DATA. VOLUME II. RANGE-ENERGY AND DE/DX PLOTS OF CHARGED PARTICLES IN MATTER,
California Univ., Berkeley. Lawrence Radiation Lab.
W. Peter Trower. 1 Jul 66, 109p
Contract W-7405-eng-48

Descriptors: (*Charged particles, Kinetic energy), (*Kinematics, Charged particles).

For abstract, see NSA 20 24.
UCRL-2426 HC$3.00 MF$0.65

20I. PLASMA PHYSICS

THERMAL CONDUCTANCES IN A COLLISIONLESS GAS BETWEEN COAXIAL CYLINDERS AND CONCENTRIC SPHERES.
Interim rept.,
Princeton Univ., N. J. Gas Dynamics Lab.
Yau Wu. Jun 66, 27p
ARL-66-0104
Contract AF 49 (638)-1271, Grant NSF-GK-59

Descriptors: (*Thermal conductivity, Gas flow), (*Gases, Thermal conductivity), Spheres, Cylindrical bodies, Temperature, Velocity, Evapotranspiration, Scattering, Mathematical analysis, Heat transfer, Couette flow.
Identifiers: Concentric spheres, Coaxial cylinders.

The thermal conductances in a collisionless gas between coaxial cylinders and concentric spheres have been obtained for arbitrary thermal accommodation coefficients. Ohis exact theory is based on the general theory of thermal conductances of collisionless gas developed recently by Wu which has been established according to his revised theory of thermal transpiration. The classical theory of thermal conductance between coaxial cylinders by Knudsen and von Smoluchowski is only accurate to the first power of the temperature difference in which the velocity distribution in the system is assumed to be nearly maxwellian. However, in the present paper, it is unnecessary to make this usual assumption and the exact theory has been established according to the revised theory of thermal transpiration. (Author)
AD-479 919 HC$3.00 MF$0.65

TIME RESOLVED STUDIES OF LASER-INDUCED PLUMES FROM SOLIDS.
Final rept.,
Naval Ordnance Lab., White Oak, Md.
Bernard V. Kessler, and Charles E. Bell. 9 Sep 66, 30p NOLTR-66-96

Descriptors: (*Plasma medium, Synthesis), (*Lasers, *Plasma generators), Photographic analysis, Velocity, Temperature, Neodymium, Spectroscopy, Emissivity, Electron density, Penetration, Foils.

Time-resolved and time-integrated measurements were made of the plasma produced by a Q-switched laser beam focused on the surface of a metallic solid. Photographic, spectroscopic and charged particle emission data were taken on a nanosecond basis using a one megawatt peak power Nd laser. Experimental results indicate a plume velocity of 2.5cm/microsec., a plasma temperature of 40,000K and an electron density of 5 x 10 to the 17th power/cc. It was also found that it requires 6-10 nanoseconds for a laser beam to penetrate a thin metal foil. (Author)
AD-643 509 HC$3.00 MF$0.65

INCOHERENT SCATTER FROM PLASMA OSCILLATIONS IN THE IONOSPHERE,
Arecibo Ionospheric Observatory, Puerto Rico.
For primary bibliographic entry see Field 4A.
AD-643 578 Not available from CFSTI.

RELATIVISTIC PLASMA IN A MAGNETIC FIELD,
Miami Univ., Coral Gables, Fla. Center for Theoretical Studies.
B. Kursunoglu. 3 Sep 65, 21p
AFOSR-66-2542
Contracts AF 49 (638)-1260, AT (40-1)-2761
Prepared in cooperation with Max Planck Institut fuer Physik and Astrophysik, Munich (WEST Germany).
Availability: Published in Nuovo Cimento v43 Ser10 p209-26 Jun 11 1966.

Descriptors: (*Plasma oscillations, Relativity theory), Magnetohydrodynamics, High-temperature research, Dispersion relations, Propagation, Integrals, West Germany.

Transverse and longitudinal oscillations of a low-density relativistic plasma in the presence of a constant magnetic field are considered by neglecting the collisions. The most general form of the relativistic dispersion relations for linear plasma oscillations is derived and the two extreme cases of zero and infinite equilibrium temperatures are discussed. (Author)
AD-643 615 Not available from CFSTI.

THE RAPID ACTING MICROWAVE INTERFEROMETER WITH DIRECT PHASE READING,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 14B.
AD-643 622 HC$3.00 MF$0.65

PROBE MEASUREMENTS IN A PULSED PLASMA: EXPERIMENTAL VERIFICATION OF THE BBM ANALYSIS FOR ION SATURATION CURRENT,
Stanford Univ., Calif. Inst. for Plasma Research.
J. C. Hosea. 25 Oct 65, 9p
AFOSR-66-2191
Contracts AF 33 (657)-11144, AF 49 (638)-1524
Availability: Published in Journal of Applied Physics v37 n7 p2695-2702 Jun 1966.

Descriptors: (*Plasma medium, Pulse systems), Measurement, Probes, Hydrogen, Argon, Electron density, Temperature, Ionic current, Magnetic fields, Voltage.

A technique of probe measurement is given which allows an easy determination of Langmuir probe curves in a reproducible pulsed plasma. The technique is then used to study a pulsed P.I.G. reflex discharge. Experimental probe curves are analyzed with a theory based on the BBM formula for ion saturation current. Comparison of probe measurements of electron density with the measurements of an 8.5-mm interferometer shows that the probe behavior is properly described by the Langmuir-BBM (Bohm, Burhop, Massey) theory. Also as predicted theoretically, the experimental ratio of floating potential to electron temperature is shown to be reasonably constant over wide variations in plasma parameters. (Author)
AD-643 657 Not available from CFSTI.

CRITICAL LENGTH DETERMINATION FOR CONVECTIVE INSTABILITIES IN WEAKLY INHOMOGENEOUS PLASMAS,
General Dynamics Corp., San Diego, Calif. General Atomic Div.
R. E. Aamodt, and D. L. Book. 2 Aug 65, 10p
AFOSR-66-2253
Contract AF 49 (638)-1546
Availability: Published in The Physics of Fluids v9 n1 p143-51 Jan 1966.

Descriptors: (*Plasma medium, Containment), (*Cyclotron waves, Reflection), Plasma oscillations, Magnetic fields, Vector analysis, Partial differential equations, Propagation, Density, Stability.
Identifiers: Magnetic mirrors.

A convergent perturbation expansion procedure for determining the reflection coefficient for unstable convective modes in a plasma with small changes in the density is derived. If the total variation of the local wave vector is small, the lowest-order reflection coefficient can be used to determine the critical length of the system. The technique is used to determine the critical length of mirror machines which are subject to the convective loss-cone instability. Even for small rapid or large gentle changes in the local wave vector, critical lengths less than ten e-folding distances can be realized. (Author)
AD-643 662 Not available from CFSTI.

A METHOD FOR DETERMINING THE ACTIVE SPOT IN A PLASMOTRON CHANNEL,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. V. Petrov, and A. I. Morenov. 2 Sep 66, 4p
FTD-HT-66-87
Unedited rough draft trans. of Patent (USSR) 166 978, appl. 802268/22-2, 10 Nov 62.

Descriptors: (*Plasma generators, Nozzles), Powders, Plasma jets, Electrodes, Voltage, Electric discharges, Patents, USSR.
Identifiers: Plasmatrons.

The method of determining the active spot in a plasmotron channel using probe measurements of the arc discharge is different in that to find the most effective place of introducing the powder into the plasma jet, the position of the active spot is determined from the break of the probe characteristics of 'distance-voltage.' (Author)
AD-643 699 HC$3.00 MF$0.65

INVESTIGATION OF BASIC PROPERTIES OF GASEOUS PLASMAS.
Final rept. 1 Aug 63-31 Jul 66,
Illinois Univ., Urbana. Gaseous Electronics Lab.
L. Goldstein. Oct 66, 12p
AFCRL-66-752
Contract AF 19 (628)-3307

Descriptors: (*Plasma physics, Physical properties), Cryogenics, Gases, Helium, Electric discharges, Electrons, Recombination reactions.

The report briefly reviews the original purposes of the investigations, the results obtained, and lists the technical reports and the scientific journal articles in which the results of the investigations have been published. (Author)
AD-643 768 HC$3.00 MF$0.65

FARADAY ROTATORS FOR HIGH POWER LASER CAVITIES,
Advanced Kinetics, Inc., Costa Mesa, Calif.
Nicholas George, and R. W. Waniek. 25 Jan 66, 5p
AFOSR-66-2369
Contract AF 49 (638)-1359
Prepared in cooperation with California Inst. of Tech., Pasadena.
Availability: Published in Applied Optics v5 p1183-5 Jul 1966.

Descriptors: (*Lasers, Magneto-optic effect), Control systems, Magnets, Electromagnetic pulses.

The large values of Faraday rotation obtained with the use of pulsed high field magnets are shown to be applicable to the control of laser cavities. Experiments are described in which high-field magnets are operated up to 400k0e in order to introduce large rotations in short, highly transparent optical media. With a ruby laser, interesting pulse enhancement and periodic equispaced output is observed and related to the switching rate of the field, typically 20 k0e/microsec. Used with a cryptocyanine shutter, it is found that either a single giant pulse or a well-spaced series of pulses can be obtained. These are synchronized with respect to the varying magnetic field with fractional microsecond accuracy. (Author)
AD-643 769 Not available from CFSTI.

ELECTRODELESS PLASMA EXPERIMENTS,
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
K. T. Lian. 17 Oct 60, 4p Memo-22, PIBMRI-871-60
Contract AF 30 (602)-2149

Descriptors: (*Discharge tubes, Plasma physics), Plasma medium, Electric discharges, Experimental data, Performance (Engineering).

The design of a suitable electrodeless discharge tube involves a knowledge of how the various parameters of the gas and the geometry chosen affect the development of the discharge. As the geometries involved are complicated and not amenable to calculation, the experimental discharge tubes which have been operated were studied to determine the effects.
AD-643 787 HC$3.00 MF$0.65

PENETRATION OF THE ELECTROMAGNETIC FIELD IN MOVING CONDUCTORS,
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
Enrico Levi. 6 Sep 61, 5p Memo-33, PIBMRI-950-61
Contract AF 30 (602)-2149

Descriptors: (*Magnetohydrodynamic generators, Analysis), Electromagnetic fields, Penetration, Conductivity, Magnetohydrodynamics, Pulse generators, Permeability (Magnetic).

In general, it can be said that in a fully ionized gaseous plasma the conductivity is independent of the density and in a solid non-ferromagnet material the permeability is essentially that of vacuum. As for the dielectric constant, it disappears from the equations once it is recognized that wave propagation phenomena do not play a significant role. In addition, the conductor is assumed to be incompressible and ideally cooled so that the pulse generation process is isothermal. The effects arising from mechanical and thermal stresses are therefore considered as small perturbations to be introduced once the body forces and the Joule losses in the conductor have been evaluated.
AD-643 788 HC$3.00 MF$0.65

THE EFFECT OF CHEMICAL ADDITIVES ON THE ELECTRON DENSITY OF PLASMA JETS.
Final rept., 1 Dec 62-30 Nov 65,
Tufts Univ., Medford, Mass. Dept. of Chemical Engineering.
Sami Atallah, Wayne A. Sanborn, and Alamin Hoodbhoy. Dec 65, 69p
AFCRL-66-5
Contract AF 19 (628)-2377

Descriptors: (*Plasma jets, Electron density), (*Additives, *Plasma sheath), Sulfur compounds, Fluorides, Reduction, Water vapor, Alumina, Silicon compounds, Oxides, Carbon, Air, Nitrogen.
Identifiers: Sulfur hexafluoride.

Three chemical means for reducing the electron density in a plasma sheath were investigated. These methods were: the addition of electrophilic atoms or radicals, the addition of micron size refractory dust particles, and the addition of substances that will undergo an endothermic reaction in the plasma. Several hydrocarbons, sulfur hexafluoride, water vapor, and submicron silicon oxide, aluminum oxide, aluminum and carbon particles were injected into air and nitrogen plasmas at pressures varying between 30 and 2.5 inches Hg. The change in X-band microwave transmission across the plasma was noted. Among all the compounds used, sulfur hexafluoride was found to be the most effective in improving transmission and this was attributed to the presence of highly electrophilic fluorine atoms. It was at least fifteen times as effective as water, on a mole basis, and therefore about twice as effective on a weight basis. (Author)
AD-643 815 HC$3.00 MF$0.65

EXPERIMENTAL EVALUATION OF MHD GENERATORS OPERATING AT HIGH HALL COEFFICIENTS,
Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 10B.
AD-643 831 HC$3.00 MF$0.65

OPTIMUM MAGNETS FOR MHD GENERATORS,
Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 10B.
AD-643 832 HC$3.00 MF$0.65

KINETIC DESCRIPTION OF A RAREFIED FULLY IONIZED PLASMA,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. M. Dyukalov. 29 Aug 66, 22p FTD-HT-66-399
TT-67-60237
Unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n6 p39-49 1964.

Descriptors: (*Plasma medium, Superaerodynamics), Equations of motion, Distribution functions, Electrons, Voltage, Trajectories, USSR.

The Vlasov system of equations is usually used to describe a rarefied plasma. The method of constructing these solutions for application to the simplest flat case is generalized below for a wide class

of problems, which are conveniently characterized as problems with emitting surfaces. (Author)
AD-643 901 HC$3.00 MF$0.65

MEASURING THE VELOCITIES OF PARTICLES IN A ROTATING PLASMA THROUGH A FABRY-PEROT INTERFEROMETER WITH PHOTOELECTRIC RECORDING,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20H.
AD-643 903 HC$3.00 MF$0.65

INTERACTION OF A MODULATED BEAM WITH A PLASMA,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Ya. B. Fainberg, and V. D. Shapiro. 29 Jul 66, 17p FTD-HT-66-302
TT-67-60245
Unedited rough draft trans. of Atomnaya Energiya (USSR), v19 n4 p336-42 1965.

Descriptors: (*Plasma medium, *Electron beams), Interactions, Excitation, Stability, Modulation, USSR, Plasma oscillations.

The work examines the excitation of longitudinal waves during the interaction of a modulated beam of electrons with a plasma. The conditions for the appearance of instability and also the frequency spectrum and the increments of increase in oscillations are found. (Author)
AD-643 930 HC$3.00 MF$0.65

GAS DISCHARGE SOURCES OF IONS AND ATOMS WITH A GLOWING CATHODE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
O. V. Kozlov, Yu. A. Skoblo, and A. V. Chernetskii. 29 Aug 66, 11p FTD-HT-66-318
TT-67-60247
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) v8 n2 p87-91 1965.

Descriptors: (*Gas discharges, Probes), (*Plasma medium, *Probes), Sources, Molecular beams, Ion beams, Cathodes, USSR.

The article introduces the results of work on sources with uninterrupted and pulsed regimes. Special attention is devoted to obtaining a well focused ion bundle and significant densities of the ion flux on a collector that is some distance (from several tens of centimeters to several meters) from the source. The source was used for probing the plasma with beams of fast particles. (Author)
AD-643 932 HC$3.00 MF$0.65

MEASUREMENT OF STICKING PROBABILITY AND RECOMIEATION COEFFICIENT OF ELECTRONS IN GASSES BY THE METHOD OF PENETRATING RADIATIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. B. Brodskii, and S. E. Zagik. 24 Aug 66, 18p FTD-MT-65-545
TT-67-60267
Edited machine trans. of mono. Izmereniya Koeffitsientov Prilipaniya i Rekombinatsii Elektronov v Gazakh Metodom Pronikayushchikh Izluchenii, Moscow 1965 14p.

Descriptors: (*Plasma medium, *Electrons), (*Afterglows, Electrons), (*Air, Recombination reactions), (*Oxygen, Recombination reactions), Gas discharges, Very high frequency, Electron bombardment, Gamma rays, Waveguides, Probability, Atomic energy levels, Electromagnetic pulses, Xenon, USSR.

A technique and experimental results for measurements of gas pressure dependence of attachment and recombination coefficients for thermalized electrons in air and oxygen are described. (Author)
AD-643 957 HC$3.00 MF$0.65

INVESTIGATION OF AN ELECTRODELESS RING DISCHARGE IN ARGON AND IN AIR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. T. Aladev, I. G. Kulakov, O. L. Magdagiev, and A. P. Shatilov. 30 Jun 66, 20p FTD-MT-65-549
TT-67-60289
Edited machine trans. of mono. Issledovanie Bezelektrodnogo Koltsevogo Razryada v Argone i v Vozdukhe, Mowcow, 1965 16p.

Descriptors: (*Gas discharges, *Plasma physics), USSR, Air, Argon, Power, Efficiency, Pressure.

The work describes electrodeless ring discharges in argon and in air obtained in a cylindrical chamber with diameter of 60 mm at a frequency of 2 Mc. There are obtained stable discharges in the range of pressures of 0.4 mm Hg-1 atm in a closed pipe without hydrodynamic stabilization. There are given values of power absorbed by the discharge. For a stabilized discharge in argon at atmospheric pressure there is measured the power absorbed by the discharge and power dissipated on the walls of the chamber at three values of flow rate of gas. There is performed an appraisal of the efficiency of heating of gas in the electrodeless discharge. For certain regimes of a stabilized discharge in argon at atmospheric pressure, the maximum temperature in the discharge and concentration of electrons are measured by the spectral method. (Author)
AD-644 005 HC$3.00 MF$0.65

INVESTIGATION OF PLASMA IN LAMINAR AND TURBULENT HYDROCARBON FLAMES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 21B.
AD-644 006 HC$3.00 MF$0.65

WAVE GUIDE PROPERTIES OF A GAS-ELECTRON BEAM SYSTEM,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20G.
AD-644 015 HC$3.00 MF$0.65

PLASMA OSCILLATION,
Oxford Univ. (England). Dept. of Engineering Science.
H. Motz. 1966, 55p
AFOSR-66-2823
Grant AF-EOAR-37-65
Availability: Published in Reports on Progress in Physics v29 pt2 p623-74 1966.

Descriptors: (*Plasma oscillations, Mathematical analysis), Kinetic theory, Acoustic properties, Damping, Equations, Cyclotron resonance phenomena, Great Britain.

The review starts with a discussion of the status of the Vlasov equation in statistical mechanics and gives a resume of macroscopic equations obtained from the Vlasov equation which serve as a basis for the determination of all the modes of oscillations which the plasma can support. In the infinite uniform plasma longitudinal oscillations can exist uncoupled from transverse ones, and the former are investigated in detail. Experiments on acoustic waves are reviewed and the theory which takes account of boundary conditions is found to be related to that of ionization waves. The macroscopic theory does not include collisionless damping, as originally discovered by Landau, and this is treated in some detail. Thereafter beam instabilities are reviewed and classified. The article finishes with a short discussion of resonance oscillations in hot non-uniform plasmas and cyclotron harmonic phenomena. (Author)
AD-644 030 Not available from CFSTI.

PECULIARITIES OF BURNING OF ELECTRIC ARC IN PLASMATRONS AND SIMILARITY CRITERIA,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 7C.
AD-644 033 HC$3.00 MF$0.65

INSTABILITY OF THE CURRENT LAYER IN NONHOMOGENEOUSLY MAGNETIZED PLASMA,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. M. Shulman. 24 Aug 66, 8p FTD-TT-66-19
Unedited rough draft trans. of Byulleten' Stantsii Opticheskogo Nablyudenia Iskusstvennykh Sputnikov Zemli (USSR) n10 p70-3 1964.

Descriptors: (*Plasma medium, Stability), (*Magnetohydrodynamics, Stability), Adiabatic gas flow, One-dimensional flow, USSR.

The one-dimension problem of plasma stability in the region of a neutral plane was solved. The result shows that on account of the adiabaticity the plasma proves to be unstable. (Author)
AD-644 037 HC$3.00 MF$0.65

OPTICAL RESONATOR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. K. Ablekov. 9 Sep 66, 7p FTD-HT-66-109
Unedited rough draft trans. of Patent (USSR) 176 329, appl. 880471/26/25, 6 Feb 64.

Descriptors: (*Resonators, *Lasers), Prisms (Optics), Patents, USSR, Optical equipment.

The object of the invention is an optical resonator, consisting of two prisms set with their bases at the Brewster angle to the axis of the resonator. To remove the reflection losses and to obtain discrete magnitudes of the dispersion and of the necessary length of the path of rays of open circulation inside the resonator, one of the prisms is made in the form of a converted tripole with the angle between the base and one of the faces equal to the Brewster angle, the second is made in the form of a multilateral pyramid with an even number of faces, the opposite faces being mutually perpendicular, with equal angles at the apex and with the plane of the base set at the Brewster angle to the axis of symmetry of the pyramid, and the angle between one face and the base must be within limits of alpha-(alpha + pi/2k), where alpha is a constant that depends upon the selection of the face; 2k is the number of faces of the pyramid. (Author)
AD-644 043 HC$3.00 MF$0.65

COLLISIONS OF SLOW ELECTRONS WITH ATOMS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. Veldre. 30 Jun 66, 15p FTD-MT-65-542
TT-67-60311
Edited machine trans. of mono. Stolknoveniya Medlennykh Elektronov s Atomami, Moscow 1965 9p.

Descriptors: (*Plasma medium, *Electrons), (*Hydrogen, Electron Bombardment), (*Alkali Metals, Electron bombardment), (*Helium group gases, Electron bombardment), Atoms, Excitation, Atomic energy levels, Gas ionization, Elastic scattering, Lithium, Sodium, Potassium, Cesium, Electron transitions, Probability, Neon, Argon, USSR.

The paper reviews the results of the investigations on collisions between electrons and atoms which have been recently carried out in the Institute of Physics of the Academy of Sciences of the Latvian

SSR. The excitation of hydrogen atoms including exchange and strong coupling between three levels, the excitation of highly excited hydrogen atoms and the ionization of a hydrogen atom are calculated. The results of calculations for the elastic scattering and excitation of atoms in alkali metals (lithium, sodium, potassium, and cesium) by electrons having the energy up to 5 ev are presented. The cross sections of a series of transitions in atoms of rare gases (neon, argon) treated by electrons were found. (Author)
AD-644 072 HC$3.00 MF$0.65

THEORETICAL METHODS OF INVESTIGATION OF FREEZING OF CHEMICAL AND ELECTRONIC PROCESSES IN LOW-TEMPERATURE PLASMA JETS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. S. Aravin, N. M. Kuzentsov, and Yu. S. Sayasov. 30 Jun 66, 15p FTD-MT-65-546
TT-67-60312
Edited machine trans. of mono. Teoreticheskie Metody Issledovaniya Zakalki Khimicheskikh i Elektronnykh Protsessov v Nizkotemperaturnykh Plazmennykh Struyakh, Moscow, 1965 9p. Presented at the 20th International Congress on Theoretical and Applied Chemistry.

Descriptors: (*Plasma jets, Reaction kinetics), Gas flow, Chemical reactions, Low-temperature research, Supersonic nozzles, Chemical equilibrium, USSR, Electrons.

Contents: General methods of investigation of processes of freezing gas jets; Chemical composition and gas-dynamic parameters of flow; Kinetics of electron-ion processes.
AD-644 073 HC$3.00 MF$0.65

INFLUENCE OF KINETICS OF ELEMENTARY PROCESSES ON IONIZATION OF LOW-TEMPERATURE PLASMA JETS WITH VARIOUS LAWS OF DISTRIBUTION OF PARAMETERS IN THE JETS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
N. I. Yushchenkova, V. I. Nemchenko, and S. A. Lyzhnikov. 30 Aug 66, 20p FTD-MT-65-548
TT-67-60313
Edited machine trans. of mono. Vliyanie Kinetiki Elementarnykh Protsessov na Ionizatsiyu Strui Nizkotemperaturnoi Plazmy pri Razlichnykh Zakonakh Raspredelaniya Parametrov v Struyakh, Moscow, 1965 16p. Presented at the 20th International Congress on theoretical and applied chemistry.

Descriptors: (*Plasma jets, Ionization), (*Ionization, Reaction kinetics), Low-temperature research, Supersonic flow, Frozen equilibrium flow, Recombination reactions, Electrons, Axially symmetric flow, Supersonic nozzles, USSR.

Results are given of calculations of the ionization of supersonic flows of low-temperature plasma, taking into account kinetics of elementary processes and laws of supersonic expansion corresponding to conditions of flow in supersonic nozzles and jets. (Author)
AD-644 074 HC$3.00 MF$0.65

NUCLEAR FUSION VOL 6 NO. 2 1966: SELECTED ARTICLES.
Technical Information Extension (AEC) Oak Ridge, Tenn.
For primary bibliographic entry see Field 18A.
For abstract, see NSA 20 24.
AEC-TR-6674 HC$3.00 MF$0.65

MICROWAVE INTERACTION WITH LABORATORY PLASMA CONFINED IN A DIPOLAR MAGNETIC FIELD.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
R. G. Quinn. May 66, 25p NASA-TM-X-55576, X-615-66-239

Descriptors: *Magnetic field, *Microwave radiation, *Plasma, Attenuation, Cross section, Dipole, Discharge, Electromagnetic, Field, Glow, Magnetic, Microwave, Phase, Property, Radar, Radiation, Scattering, Shift, Sphere, Wave.

For abstract, see STAR 05 02.
N67-11358 HC$3.00 MF$0.65

A SURVEY OF CLASSICAL LANGMUIR PROBE THEORY WITH APPLICATIONS TO FLOWING IONIZED GASES INTERIM REPORT.
Polytechnic Inst. Of Brooklyn, N. Y. Dept. Of Aerospace Engineering And Applied
S. H. Schwartz. Oct 64, 25p NASA-CR-79367, PIBAL-845
Grant NSG-409

Descriptors: *Ionized gas, *Langmuir probe, Density, Electron, Electrostatic, Flow, Gas, Ionized, Particle, Plasma, Sheath, Temperature, Theory, Thickness.

For abstract, see STAR 05 02.
N67-11698 HC$3.00 MF$0.65

CHARACTERIZATION OF RE-ENTRY PLASMAS.
France. Office National D Etudes Et De Recherches Aerospatiales, Chatillon-sous-bagneux.
For primary bibliographic entry see Field 4A.
For abstract, see STAR 05 02.
N67-11869 HC$3.00 MF$0.65

PRODUCTION OF SUPERHEATED HYDROGEN PLASMA USING INDUCTION HEATING OF COLD PLASMA AND DC PLASMA ENHANCEMENT.
Humphreys Corp., Concord, N. H. Tafa Div.
M. L. Thorpe. Dec 66, 22p NASA-CR-657
NASA ORDER C-69512A

Descriptors: *High temperature plasma, *Hydrogen plasma, *Induction heating, Argon, Cold, Current, Direct, Electron, Energy, Enhancement, Frequency, Gun, Heating, High temperature, Hydrogen, Induction, Plasma, Production, Radio, Superheating.

For abstract, see STAR 05 02.
N67-11952 HC$3.00 MF$0.65

HOLLOW CATHODE PLASMA PENETRATION STUDY FINAL REPORT.
Bunker-ramo Corp., Canoga Park, Calif.
J. Litton, P. B. Myers, and G. Russell. Dec 66, 38p NASA-CR-660
Contract NAS12-9

Descriptors: *Electron beam, *Plasma sheath, *Reentry vehicle, Beam, Cathode, Collimation, Communication, Discharge, Electron, Hollow, Microwave, Mode, Penetration, Plasma, Radiation, Reentry, Sheath, Vehicle.

For abstract, see STAR 05 02.
N67-11954 HC$3.00 MF$0.65

STRUCTURE OF THE CURRENT SHEET IN A PINCH DISCHARGE.
Princeton Univ., N. J. Guggenheim Labs. For The Aerospace
R. L. Burton. Sep 66, 145p NASA-CR-80057, REPT.-783
Grant NSG-306-63

Descriptors: *Argon, *Current sheet, *Pinch effect, Current, Cylinder, Density, Discharge, Effect, Electric, Field, Gas, Gas discharge, Heating, Kerr cell, Magnetic, Measurement, Ohm, Photography, Pinch, Probe, Propagation, Sheet, Spectrum, Structure, Velocity.

For abstract, see STAR 05 02.
N67-12041 HC$3.00 MF$0.65

AN END EFFECT ASSOCIATED WITH CYLINDRICAL LANGMUIR PROBES MOVING AT SATELLITE VELOCITIES.
Maryland Univ., College Park. Dept. Of Physics And Astronomy.
R. T. Bettinger. Aug 66, 60p NASA-CR-79737, TR-566
Contract NGR-21-002-060

Descriptors: *Explorer xvii satellite, *Ion current, *Langmuir probe, Ampere, Cold, Conservation, Current, Cylinder, Electrostatic, Energy, Ion, Ionosphere, Physics, Plasma, Sheath, Vector, Velocity, Volt, Warm.

For abstract, see STAR 05 02.
N67-12063 HC$3.00 MF$0.65

SHOCK TUBE SPECTROSCOPY AT CHROMOSPHERIC TEMPERATURES RESEARCH PROGRESS REPORT, OCT. 1965 - JUL. 1966.
Maryland Univ., College Park. Inst. For Fluid Dynamics And Applied
T. D. Wilkerson. Aug 66, 26p NASA-CR-79762, BN-467
Grant NSG-359

Descriptors: *Carbon, *Neutral element, *Shock tunnel, *Spectroscopy, Atom, Density, Electron, Element, Intensity, Line, Measurement, Neutral, Plasma, Pressure, Quartz, Shock, Spectral, State, Thermodynamics, Transducer, Transition, Tube, Tunnel, Velocity.

For abstract, see STAR 05 02.
N67-12078 HC$3.00 MF$0.65

CALCULATIONS OF OPTIMUM SEED CONCENTRATIONS IN CESIUM AND POTASSIUM NON-EQUILIBRIUM PLASMAS.
General Electric Co., Philadelphia, Pa. Missile And Space Div.
F. H. Shair, and J. M. Smith. Mar 66, 23p NASA-CR-79518, R66SD19
Contract NAS3-6260

Descriptors: *Electric conductivity, *Magnetohydrodynamics, *Nonequilibrium plasma, Alkali, Cesium, Concentration, Conductivity, Electric, Gas, Generation, Metal, Nonequilibrium, Optimum, Plasma, Potassium, Power.

For abstract, see STAR 05 02.
N67-12212 HC$3.00 MF$0.65

IONIC SOUND WAVES IN PLASMAS FINAL REPORT.
Denver Univ., Colo.
J. B. Calvert. Sep 66, 15p NASA-CR-79287, DRI-2359
Grant NSG-518

Descriptors: *Plasma wave, *Pressure apparatus, *Sound wave, *Wave propagation, Acoustic, Apparatus, Collision, Collisionless, Discharge, Disturbance, Helium, Ionized, Medium, Plasma, Pressure, Propagation, Sound, Transition, Tube, Wave.

For abstract, see STAR 05 02.
N67-12223 HC$3.00 MF$0.65

A GENERALIZED MAGNETOHYDRODYNAMIC ENTRANCE FLOW MODEL. PART II. SERIES SOLUTION,
Sandia Corp., Albuquerque, N. Mex.

Group 20I—Plasma physics

W. S. Saric, and K. J. Touryan. Sep 66, 324p
Contract AT (29-1)-789

Descriptors: (*Incompressible flow, Magnetohydrodynamics), (*Magnetohydrodynamics, Mathematical models).

For abstract, see NSA 20 24.
SC-RR-66-357 HC$3.00 MF$0.65

ONE-DIMENSIONAL CALCULATION OF THE TIME-DEPENDENT CONDUCTIVITY OF GASES WITH A STRONG VARIABLE SOURCE OF IONIZATION,
California Univ., Livermore. Lawrence Radiation Lab.
W. S. Barnes. 26 May 66, 49p
Contract W-7405-eng-48

Descriptors: (*Programming (Computers), Gas ionization), (*Gas ionization, Conductivity).

For abstract, see NSA 20 24.
UCRL-14914 HC$3.00 MF$0.65

20J. QUANTUM THEORY

APPLICATION OF THE QUANTUM DEFECT METHOD TO PHOTOIONIZATION CALCULATIONS.
Technical rept.,
Cornell Univ., Ithaca, N. Y.
E. J. McGuire. Aug 63, 41p TR-2
AROD-2810-12
Contract DA-31-124-ARO (D)-43

Descriptors: (*Quantum mechanics, Ionization), Electrons, Quantum statistics, Dipole moments, Aluminum, Carbon, Boron, Beryllium, Lithium, Argon, Neon, Helium, Copper, Integrals, Absorption, Photons, Energy.
Identifiers: 1963, Hartree-Fock, Photoionization, Schrodinger equation.

The report discusses the following: The Hartree Method; The Quantum Defect Method; Application to Neon; K Absorption in the Light Elements.
AD-423 664 HC$3.00

TOPOLOGY OF SOME SPHEROIDAL METRICS,
Maryland Univ., College Park. Dept. of Physics and Astronomy.
David M. Zipoy. 16 Jun 64, 8p
AFOSR-66-2160
Grant AF-AFOSR-409-63
Availability: Published in Journal of Mathematical Physics v7 n6 p1137-43 Jun 1966.

Descriptors: (*Topology, Partial differential equations), Relativity theory, Bodies of revolution, Differential geometry.

The solutions of Einstein's vacuum field equations, are found when quasi-oblate and prolate spheroidal coordinates are used. The solutions for the 'New tonian' potential can be written as a linear combination of Legendre polynomides of integral order l. For oblate coordinates the solutions for each l have a ring singularity and have a double sheeted topology; one can get from one sheet to the other by going through the ring. When the l=0 and l=1 solutions are combined an infinite-sheeted topology results from the nonlinear character of the field equations. In general the geometry is asymptotically flat on only one sheet; on the others it is highly distorted. In some cases the region near the 'ring singularity' opens out into a multisheeted infinite space. For the prolate coordinates the solutions contain a line singularity of finite length. In general, the prolate coordinate solutions are much less rich in varied topologies than are the oblate solutions. (Author)
AD-643 451 Not available from CFSTI.

THEORY OF ATOM-METAL INTERACTIONS. I. APPLICATION OF QUANTUM-MECHANICAL COLLISION THEORY TO FIELD-IONIZATION PROCESSES.
Pennsylvania State Univ., University Park. Dept. of Physics.
For primary bibliographic entry see Field 7D.
AD-643 469 Not available from CFSTI.

A DISCONTINUITY FORMULA FOR PHYSICAL-REGION SINGULARITIES,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
J. B. Boyling. 10 Jan 66, 13p
AFOSR-66-2722
Grant AF-EOAR-36-65
Availability: Published in Nuovo Cimento v44 Ser10 p379-89 Jul 21 1966.

Descriptors: (*S-matrix, *Perturbation theory), Functions, Integrals, Topology.
Identifiers: Singularity.

The methods of homology theory are applied to an analytic function defined initially as the integral of an analytic function over a compact subset of a submanifold of a real Euclidean space whose boundary is piecewise analytic. Under the assumption that the integrand is meromorphic and only has simple poles a discontinuity formula is established for real singularities of the integral corresponding to simple pinches involving the poles of the integrand and the boundary surfaces of the region of integration. It is argued that this formula still applies when the integrand has other singularities provided none of these participates in the pinch. The formula is then generalized to the case of a simple pinch involving branch-point singularities as well as simple poles and boundary surfaces, and the modifications necessary when the integrand has branch-point singularities on its boundary surfaces are discussed. (Author)
AD-643 505 Not available from CFSTI.

ON CERTAIN PHYSICAL-REGION SINGULARITIES IN S-MATRIX THEORY.
Revised ed.,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
M. J. W. Bloxham. 28 Mar 66, 17p
AFOSR-66-2715
Grant AF-EOAR-79-63
Revision of manuscript submitted 17 Nov 65.
Availability: Published in Nuovo Cimento v44 Ser10 p794-808 Aug 1966.

Descriptors: (*S-matrix, Theory), Elementary particles, Perturbation theory, Integrals, Quantum mechanics.
Identifiers: Singularity.

Discontinuities of the four-to-four particle amplitude across the cuts in the physical region associated with two quadrilateral singularities are evaluated by S-matrix methods. The Cutkosky formula and positive-alpha criterion for these singularities are deduced. (Author)
AD-643 507 Not available from CFSTI.

SINGULAR POTENTIALS WITH SHORT RANGE,
Torino Univ. (Italy). Istituto di Fisica.
H. Cornille, and E. Predazzi. 20 Apr 64, 5p
AFOSR-66-2713
Grant AF-EOAR-64-39
Prepared in cooperation with CERN, Geneva.
Availability: Published in Physics Letters v10 n1 p149-51 May 15 1964.

Descriptors: (*Field theory, Potential theory), Functions, Transformations (Mathematics), Italy.

Much attention has been recently devoted to the difficulties connected with unrenormalizable field theoretical interactions. This paper presents some preliminary results limiting ourselves for sake of simplicity to the cases n=3, 4 (l=0) giving only the essential features of the method. (Author)
AD-643 620 Not available from CFSTI.

THE PROBLEM OF WIDENING AND DISPLACING ENERGY LEVELS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. I. Grigor'ev. 7 Dec 66, 12p FTD-HT-66-277
TT-67-60211
Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 3: Fizika, Astronomiya (USSR) v19 n4 p56-61 1964.

Descriptors: (*Nuclear energy levels, Field theory), (*Fermions, Nuclear energy levels), Transformations, Wave functions, S-matrix, Perturbation theory, Approximation (Mathematics), Vector analysis, Mass-energy relation, Hamiltonian, Antiparticles, USSR.

The normalization method is used for obtaining finite expressions for displacing and widening energy levels at transitions of an arbitrary form. This report pursues the construction of an apparatus with an arbitrary number of particles in initial and final states, suitable during the investigation of processes and the evaluation of how the renormalization method can be used in the given problem for the exclusion of divergences. A Schroedinger representation is used in the equation. An S-matrix is broken into a sum of normal derivatives which corresponds to various physical processes, matrices of transition. The perturbation method was used during the obtaining of a certain factor. A second approximation analysis within the frames of any 'staircase' approximation is cited. The realization method used does not propose an invariable use of any concrete approximations, therefore it allows us to obtain the final expressions for the displacement and width of energy levels in an arbitrary approximation. The formulas are valid in case of a spontaneous as well as forced irradiation. They can be accepted for processes with any number of particles in the initial state. The covariance of formulation can be useful in relativistic problems. A concrete selection of the initial state vector also determines the selection of this or any other physical problem. (Author)
AD-643 633 HC$3.00 MF$0.65

BROKEN U (3) SYMMETRY AND SEMILEPTONIC WEAK INTERACTIONS.
Revised ed.,
Harvard Univ., Cambridge, Mass. Dept. of Physics.
H. T. Nieh. 7 Mar 66, 11p
AFOSR-66-2100
Contract AF 49 (638)-1380
Revision of manuscript submitted 17 Jan 66.
Availability: Published in The Physical Review v145 n4 p1012-20 Jun 24 1966.

Descriptors: (*Elementary particles, Groups (Mathematics)), (*Nuclear reactions, *Field theory), (*Decay schemes, Field theory), Mathematical models, Baryons, Leptons, Invariance, Mesons, K mesons, Pions, Leptons, Interactions.
Identifiers: Symmetry (Quantum mechanics), Weak interactions.

A phenomenological field-theoretic model of U (3)-symmetry breakdown is proposed. It allows a unified treatment of both mass renormalization and field renormalization of the phenomenological fields associated with particles. Specifically, the renormalization effects on the semileptonic weak coupling constants were calculated. Based on this model, it is shown that the empirically observed damping factor for Delta Y = 1 transitions cannot be explained by symmetry-breaking effects and therefore the Cabibbo angle is intrinsic to weak-interaction theory. From the calculation, a 20%

renormalization effect is expected on all Delta Y = 1 axial-vector coupling constants for baryon leptonic decays. This renormalization effect is supported by the present experimental information about the GA/GV ratio of lambda beta decay. To make a sharp test of the model, more accurate experimental data concerning the GA/GV ratios of the baryon leptonic decays are required. The model also reproduces the Ademollo-Gatto theorem on the nonrenormalization of the Delta Y = 1 vector transitions and Okubo's speculated mass formulas for vector mesons. (Author)
AD-643 839 Not available from CFSTI.

TRANSVERSE INELASTIC FORM FACTORS IN 12C FROM A CONTINUUM MODEL.
Interim rept.,
Stanford Univ., Calif. Dept. of Physics.
James L. Friar. 3 Dec 65, 13p
AFOSR-66-2457
Contract AF 49 (638)-1389
Availability: Published in Nuclear Physics v84 p150-60 1966.

Descriptors: (*Carbon, *Nuclear resonance), (*Nuclear energy levels, Carbon), Electrons, Inelastic scattering, Theory, Wave functions, Momentum, Stable isotopes.
Identifiers: Form factors.

The transverse inelastic form factors in carbon-12, which appear in electron excitation of the giant resonance continuum states, were investigated. Using a particle-hole model the J-p1- form factor was calculated assuming the particle lies in the continuum. It was found that as momentum transfer increases the peak of the resonance shifts in energy. The integrated form factor was calculated and showed the characteristic dip with increasing momentum transfer. In addition, it was found to be roughly 70% of that calculated using bound state wave functions for the excited states. (Author)
AD-643 848 Not available from CFSTI.

THE DIRAC BRA AND KET FORMALISM,
Emmanuel Coll., Cambridge (England).
J. E. Roberts. 5 Aug 65, 11p
AFOSR-66-2717
Grant AF-EOAR-79-63
Availability: Published in Journal of Mathematical Physics v7 n6 p1097-1104 Jun 1966.

Descriptors: (*Quantum mechanics, *Hilbert space), Great Britain, Theory, Hamiltonian, Particles, Interactions, Functions.
Identifiers: Dirac formalism.

The place of the Dirac formal m in quantum theory is investigated using rigged Hilbert spaces. Emphasis is laid on the representation of observables by continuous linear operators and on the existence of sufficient eigenkets. Using the concept of labeled observables, a canonical procedure is given for constructing a rigged Hilbert space and the bra and ket spaces are constructed for nonrelativistic quantum systems of n interacting particles. Spectral theory is investigated in this framework and the results are compared with the Dirac formalism. (Author)
AD-643 888 Not available from CFSTI.

NEW TYPE OF MOLECULAR PERTURBATION TREATMENT,
Wisconsin Univ., Madison. Theoretical Chemical Inst.
For primary bibliographic entry see Field 7D.
AD-643 916 Not available from CFSTI.

SOME REMARKS ON THE RENORMALIZATION OF THE VECTOR AND AXIAL-VECTOR CABIBBO ANGLES,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
G. Furlan, and B. Renner. 14 May 66, 7p
AFOSR-66-1874
Grant AF-EAOR-36-65
Prepared in cooperation with Trieste Univ. (Italy).
Availability: Published in Il Nuovo Cimento v44 Ser10 p536-41 1966.

Descriptors: (*Decay schemes, Matrix algebra), Mesons, Groups (Mathematics), Algebras, Vector analysis, Strange particles, Great Britain, Italy.
Identifiers: Current algebras, Symmetry (Quantum mechanics).

A treatment of weak-vector and axial-vector currents in leptonic weak interactions of hadrons is presented which avoids certain previously encountered difficulties involving deviations from SU3 symmetry.
AD-643 917 Not available from CFSTI.

ON THE EXISTENCE OF AXIAL VECTOR MESONS,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
B. Renner. 23 Apr 66, 3p
AFOSR-66-2092
Grant AF-EOAR-36-65
Availability: Published in Physics Letters v21 n4 p453-4 Jun 1 1966.

Descriptors: (*Mesons, Matrix algebra), (*Nuclear resonance, Mesons), Vector analysis, Elementary particles, Algebras, Invariance, Decay schemes, Great Britain.
Identifiers: Current algebras.

Certain current algebra commutators can only be saturated if the existence of axial vector mesons is assumed. As possible candidates the A1 (1072) and Kc (1215) resonances are examined. (Author)
AD-643 947 Not available from CFSTI.

NEW PRINCIPLES OF CONSTRUCTION OF THE PHYSICAL THEORY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. A. Efimov. 30 Aug 66, 87p FTD-MT-65-37
Edited machine trans. of Astronomicheskaya Observatoriya, Pulkovo. Izvestiya (USSR) v23 n2 p118-51 1963.

Descriptors: (*Relativity theory, Astrophysics), Mass-energy relation, Energy, Light, Momentum, Theory, USSR.

The purpose of the work is to show the heuristic force of the basic laws of nature, if a new energy content is imparted to them.
AD-643 962 HC$3.00 MF$0.65

ZERO SOUND IN LIQUID 4He AND 3He,
Illinois Univ., Urbana.
David Pines. 1966, 11p
AROD-431:71
Contract DA-31-124-ARO (D)-114
Proceedings of the Sussex Univ. Symposium 16-20 Aug 65.
Availability: Published in Quantum Fluids (Amsterdam) p258-66 1966.

Descriptors: (*Helium, Acoustic properties), Phonons, Frequency, Sound, Excitation, Relaxation time, Superconductivity, Superfluidity.

Arguments are presented for a zero sound mode in liquid 3He and 4He over a wide temperature region.
AD-644 055 Not available from CFSTI.

SPIN DEVIATION PROBABILITIES IN ORDERED MAGNETIC MATERIALS.
Pennsylvania Univ., Philadelphia. Dept. of Physics.
For primary bibliographic entry see Field 20C.
AD-644 076 HC$3.00 MF$0.65

ANTIFERROMAGNETICALLY COUPLED SPIN IMPURITIES IN FERROMAGNETS.
Pennsylvania Univ., Philadelphia. Dept. of Physics.
For primary bibliographic entry see Field 20C.
AD-644 077 HC$3.00 MF$0.65

SUM RULES FOR STRONG INTERACTIONS,
Torino Univ. (Italy). Istituto di Fisica.
V. DeAlfaro, S. Fubini, and G. Rossetti. 20 May 66, 6p
AFOSR-66-2714
Grant AF-EOAR-29-66
Availability: Published in Physics Letters v21 n5 p576-9 Jun 15 1966.

Descriptors: (*Elementary particles, Interactions), (*Decay schemes, Mathematical prediction), Nuclear reactions, Nuclear scattering, Nuclear spins, Algebras, Vector analysis, Italy.
Identifiers: Current algebras, Strong interactions, Sum rules, Unitarity.

Sum rules for strong interactions are derived from analyticity and high energy bounds for the scattering amplitudes of particles endowed with spin. Those bounds, much more stringent than for the spinless case, are strongly suggested by unitarity. (Author)
AD-644 089 Not available from CFSTI.

A NEW APPROACH TO SCATTERING BY SINGULAR POTENTIALS.
Interim rept.,
Torino Univ. (Italy). Istituto di Fisica.
S. Fubini, and R. Stroffolini. 5 May 65, 6p
AFOSR-66-2716
Grant AF-EOAR-39-64
Prepared in cooperation with Naples Univ. (Italy). Istituto de Fisica Teorica.
Availability: Published in Il Nuovo Cimento ser10 v37 p1812-6 Jul 16 1965.

Descriptors: (*Nuclear scattering, Field theory), (*Potential scattering, *Wave functions), Mathematical models, Potential theory, S-matrix, Elementary particles, Italy.

The problem of giving an unambiguous mathematical meaning to the solutions of nonrenormalizable field theories has been the object of several investigations. One possible line of attack is to consider simple models given by singular nonrelativistic or relativistic potential scattering equations as a guide to obtain new ideas and techniques to be generalized to the field-theoretical case. A discussion is given of a new point of view in the study of singular potentials, which allows a systematic treatment of a large class of potentials. The approach proposed is essentially based on the study of the polydromy of the wave function Psi (r) in the r variable. The important point is that both singular and regular potentials exhibit very simple and general features in this framework.
AD-644 091 Not available from CFSTI.

NUCLEON MAGNETIC MOMENTS AND PHOTOPRODUCTION SUM RULES.
Interim rept.,
Torino Univ. (Italy). Istituto di Fisica.
S. Fubini, C. Rossetti, and F. Furlan. 3 Dec 65, 12p
AFOSR-66-2749
Grant AF-EOAR-39-64
Prepared in cooperation with Trieste Univ. (Italy).
Availability: Published in Il Nuovo Cimento ser10 v43 p161-70 May 1966.

Descriptors: (*Nucleons, Magnetic moments), (*Nuclear magnetic moments, Anomalies), (*Photonuclear reactions, Integrals), Mesons, Algebras, Vector analysis, Matrix algebra, Groups (Mathe-

matics), Nuclear resonance.
Identifiers: Current algebras, Photoproduction, Sum rules.

Derivation is made in the framework of the vector-axial vector current algebra, dispersion sum rules for the nucleon anomalous magnetic moments. The magnetic moments are obtained through dispersive integrals over photoproduction amplitudes. Explicit evaluation of the sum rules shows good agreement with experimental data. (Author)
AD-644 092 Not available from CFSTI.

REDUCED-AMPLITUDE EQUATION FOR TWO- AND THREE-PARTICLE SYSTEMS - II,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
M. O. Taha. 19 Nov 65, 12p
AFOSR-66-2721
Grant AF-EOAR-79-63
Availability: Published in Il Nuovo Cimento v44 Ser10 p561-71 Aug 19 1966.

Descriptors: (*Elementary particles, Interactions), (*Decay schemes, Equations), Relativity theory, S-matrix, Diagrams, Special functions (Mathematical), Great Britain.
Identifiers: Unitarity.

Reduced-amplitude equations for two- and three-particle systems, derived in AD-644 135, are stated and their significance discussed. A relativistic generalization of the Faddeev equations for three particle to three particle interactions is obtained as a special case. Equations for final-state interactions in two particle to three particle processes are given. (Author)
AD-644 134 Not available from CFSTI.

REDUCED-AMPLITUDE EQUATIONS FOR TWO- AND THREE-PARTICLE SYSTEMS - I,
Cambridge Univ. (England). Dept. of Applied Mathematics and Physics.
M. O. Taha. 19 Nov 65, 24p
AFOSR-66-2719
Grant AF-EOAR-79-63
See also AD-644 134.
Availability: Published in Il Nuovo Cimento v44 Ser 10 p849-70 Aug 21 1966.

Descriptors: (*Elementary particles, Interactions), (*Decay schemes, Equations), Relativity theory, Nuclear scattering, Matrix algebra, Diagrams, Special functions (Mathematical), Great Britain.
Identifiers: Unitarity.

Reduced amplitudes are simultaneously defined for two particle to three particle and three particle to three particle processes. They are shown to lack the physical-region singularities: the subenergy cuts, the total discontinuity, the separate energy cuts and, in 3 to 3, the cross-energy poles. A reduced amplitude for two particle to two particle scattering lacking the three-particle, as well as the two-particle, cut is also defined. This simultaneously involves the three particle to two particle interaction for which a reduced amplitude is thus obtained. This analysis is relativistic and non-potential-theoretic. (Author)
AD-644 135 Not available from CFSTI.

THE DISCONTINUITY OF A GENERAL FEYNMAN INTEGRAL AND REGGE POLES IN PERTURBATION THEORY,
Cambridge Univ. (England). Dept. of Applied Mathematics and Theoretical Physics.
B. Hamprecht. 22 Sep 65, 25p
AFOSR-66-1876
Grant AF-EOAR-79-63
Availability: Published in Il Nuovo Cimento v42 Ser 10 p493-515 Apr 1966.

Descriptors: (*Elementary particles, Nuclear scattering), (*Nuclear scattering, Integrals), (*Regge poles, Perturbation theory), (*Perturbation theory, Nuclear scattering), Equations, Special functions (Mathematical), Integral transforms, Great Britain.
Identifiers: Feynman integrals.

A formula for the complete discontinuity across the cut of an arbitrary Feynman integral is derived. One-variable dispersion relations for a certain range of the other variable are established. Mellin transforms are extended to Feynman integrals with indefinite coefficients of s and t in the Feynman denominator. This extension is non-trivial. Finally a method is derived that allows treatment of the leading asymptotic behaviour in terms of Legendre functions instead of only in terms of powers of the variable going to infinity. It is shown that in all cases in which a leading (-t) exp. ((alpha sub i) (s)) behaviour has been obtained for a class of Feynman integrals summed, a Regge pole can explicitely be shown to exist in the Regge plane. The pole structure in the Regge plane is shown to be simpler than the one in the alpha plane. (Author)
AD-644 136 Not available from CFSTI.

20K. SOLID MECHANICS

THE CONCEPT OF EROSION STRENGTH.
Technical rept.,
Hydronautics Inc., Laurel, Md.
A. Thiruvengadam. Dec 65, 33p TR-233-9
Contract Nonr-3755 (00)

Descriptors: (*Erosion, Mechanical properties), Strain (Mechanics), Stresses, Energy, Fracture (Mechanics), Particles, Impact shock, Numerical methods and procedures, Cavitation, Sprays, Raindrops, Sand, Meteorites, Materials, Solids, Metals, Fatigue (Mechanics), Alloys.

The designer needs some numerical value of a property that represents the erosion resistance of a material. As of now, there is no single property that can be used for this purpose just as we use various properties to represent static, fatigue and creep loadings. Recent suggestions to use the strain energy of the material as given by the area of the stress-strain diagram from a simple tensile test for this purpose have a few limitations such as strain rate effects, environmental effects (temperature and corrosion) and the scarcity of stress-strain data under these conditions. In order to overcome these limitations, a new concept known as erosion strength is introduced and it is defined as the energy absorbed by the unit volumé of a material up to fracture under the action of the erosive forces in various environments. The methods to determine the erosion strength from an erosion test are outlined. (Author)
AD-484 524 HC$3.00 MF$0.65

THE RELATION BETWEEN LOAD AND PENETRATION IN THE AXISYMMETRIC BOUSSINESQ PROBLEM FOR A PUNCH OF ARBITRARY PROFILE.
Interim rept.,
North Carolina State Univ., Raleigh. Applied Mathematics Research Group.
Ian N. Sneddon. 27 Aug 64, 13p
AFOSR-66-2112
Contract AF 49 (638)-1159
Availability: Published in Int. J. Engng. Sci. v3 p47-57 1965.

Descriptors: (*Boundary value problems, Integral transforms), (*Penetration, Boundary value problems), (*Loading (Mechanics), Boundary value problems), Special functions (Mathematical), Deformation, Broaches.

A solution of the axisymmetric Boussinesq problem is derived from which are deduced simple formulae for the depth of penetration of the tip of a punch of arbitrary profile and for the total load which must be applied to the punch to achieve this penetration. Simple expressions are also derived for the distribution of pressure under the punch x and for the shape of the deformed surface. The results are illustrated by the evaluation of the expressions for several simple punch shapes. (Author)
AD-643 564 Not available from CFSTI.

A NOTE ON THE PROBLEM OF THE PENNY-SHAPED CRACK,
North Carolina State Univ., Raleigh. Applied Mathematics Research Group.
Ian N. Sneddon. 12 Sep 64, 5p
AFOSR-66-2114
Contract AF 49 (638)-1159
Availability: Published in Proc. Camb. Phil. Soc. v61 p609-11 1965.

Descriptors: (*Fracture (Mechanics), Stresses), Load distribution, Integral equations.

Consideration is given to the problem of determining the distribution of stress in the neighborhood of a penny-shaped crack. Simple expressions are derived for the calculation of the stress intensity factor and the energy required to open up the crack in terms of a general (axisymmetric) pressure distribution. The solution is based on an elementary solution of a pair of dual integral equations. (Author)
AD-643 565 Not available from CFSTI.

THE STRESS ON THE BOUNDARY OF AN ELASTIC HALF-PLANE IN WHICH BODY FORCES ARE ACTING,
North Carolina State Univ., Raleigh. Applied Mathematics Research Group.
For primary bibliographic entry see Field 12A.
AD-643 566 Not available from CFSTI.

AXIAL SHEAR VIBRATIONS OF A CYLINDER OF DECREASING THICKNESS.
Revised ed.,
Northwestern Univ., Evanston, Ill.
J. D. Achenbach. 18 Mar 66, 9p
Contract Nonr-1228 (34)
Revision of manuscript submitted 23 Sep 65. Presented at the AIAA Symposium on Structural Dynamics and Aeroelasticity, Boston, Mass., August 30-September 1, 1965.
Availability: Published in AIAA Journal v4 n7 p1233-40 Jul 1966.

Descriptors: (*Cylindrical bodies, *Vibration), Shear stresses, Stresses, Ablation, Rocket propellant grains, Equations of motion, Elasticity, Thickness, Viscoelasticity, Rocket cases, Bonding.

The loss of mass and stiffness due to ablation may significantly influence the vibrations of a solid propellant grain. This paper presents an analytical study of the axial shear vibrations of a long hollow cylinder that is subjected to time-dependent body forces in the axial direction. The outer surface of the cylinder is bonded to a rigid case, and the inner radius increases monotonically with time. An expression is determined for the shear stress at the bond interface. It is shown that the instantaneous frequency of the shear bond stress increases, and that its amplitude decreases toward burnout time. Various ablation rates are considered. Conventional methods of analysis, such as separation of variables and Fourier-Bessel analysis, are not directly applicable in this problem, since the boundary conditions are prescribed on a time-dependent surface. A modified Fourier-Bessel mode is defined that satisfies the boundary conditions. By substituting this mode into the equation of motion, a solution is obtained by asymptotic methods in the vicinity of the bond interface. The axial shear vibrations of an ablating viscoelastic cylinder are discussed briefly. (Author)
AD-643 577 Not available from CFSTI.

PERCUSSIVE (SHOCK) COMPRESSION OF QUARTZ,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. A. Adadurov, A. N. Dremin, S. F. Pershin, V. N. Rodionov, and Yu. N. Ryabinin. 7 Dec 66, 21p FTD-H-66-211
TT-67-60184
Udarnoe Szhatie Kvartsa, unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n4 p81-9 1962.

Descriptors: (*Quartz, *Shock waves), Shock (Mechanics), Compressive properties, Stresses, Silicon compounds, Oxides, USSR, High-pressure research.
Identifiers: Coesite.

There is a large amount of silica in the earth's crust, which appears to be the main rock-forming material. Due to the fact that the high compressibility of silica at various depths may influence phenomena taking place underground (high polymorphic conversions), the study of silica conversion involving dense forms at a high temperature and pressure was made. In 1953, a crystalline form of silica--coesite with a density of 3.01 g/cu cm was discovered, obtained by a static pressure of 35,000 kgm at temperatures from 500-800C. Coesite was found to come directly from quartz without using mineralizers; it was found in three large meteorite craters with a probable percussive origin. There arose the necessity to prove that coesite is formed in a very short action time under high pressure and temperature. Quartz crystals were cut at various angles and subjected to different types of compression shock waves. Screens of aluminum and iron were prepared to measure the shock waves. The waves were created by reflecting various detonation eaves from the screens and by percussion of aluminum and iron flakes accelerated by explosion products. Samples with a width to height ratio of more than three were used in all experiments. Time intervals were taken by an electrocontact method and four oscillograms. Many equations are given with the application of the Hook Law. One of the conclusions is that displacing stresses within the body can be disregarded in comparison to normal stresses. Here the material is investigated as a liquid. An elastic and a plastic wave are produced, which react a certain way and then act as one. (Author)
AD-643 598 HC$3.00 MF$0.65

EXPERIMENTAL CHECK OF THEORETICAL METHODS OF THE CALCULATION OF STRENGTH,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. A. Kolesnikov. 21 Nov 66, 24p FTD-MT-66-25
TT-67-60204
Eksperimentalnaya Proverka Teoreticheskikh Metodov Rascheta na Prochnist, edited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR), v5 n3 p87-97 1962.

Descriptors: (*Loading (Mechanics), Experimental data), Theory, Test methods, Deformation, Tensile properties, Stresses, Structural properties, Transducers, Measurement, Effectiveness, USSR.

The simple summation of information extracted as a result of the processing of experimental data for transducers of elongations (displacements) processed separately from each other makes it possible to establish the linearity (nonlinearity) of the tense deformed state of the system (the zone and elements not controlled by measurements are excluded), to reveal the places of intensive increase of elongations, and to establish the approach of fluidity for elements found in a uniaxial stressed state. But with a sufficiently large quantity of transducers rationally fixed, the group processing permits deriving more complete information considerably exceeding the sum of information of the isolated transducers. In this work the method applied earlier to the treatment of isolated transducers is widespread in groups selected accordingly. Such an allowance permitted constructing a uniform method in conducting a confidence evaluation of theoretical methods of calculation according to experimental investigation. The control is conducted not only for the theoretical calculation as a whole, but also for the separate elements. Hypotheses and separate parameters are estimated, and a forecast of the behavior of the system is constructed, etc. Group processing of an experiment permits considerably expanding the volume and quality of information on conducting a system under a load and the obtaining of confidence estimates for theoretical methods of calculation. (Author)
AD-643 642 HC$3.00 MF$0.65

AERO-ACOUSTIC EXCITATION OF STRUCTURES,
David Taylor Model Basin, Washington, D. C. Acoustics and Vibration Lab.
Alan Powell. Sep 66, 17p
DTMB-2232
Presented at Society of Automotive Engineers' 'National Aeronautic and Space Engineering and Manufacturing Meeting', Los Angeles, October 4-8, 1965.

Descriptors: (*Structures, Vibration), (*Sound, *Loading (Mechanics)), Acoustics, Aerospace craft, Boundary layer, Aeroelasticity, Jet engine noise, Fatigue (Mechanics).

Two important sources of random aeroacoustic excitation of aerospace structures are the jets of both gas turbines and rockets, and turbulent boundary layers. Their dominant characteristics relevant to their loading of structures, such as the cross-correlation in narrow frequency bands of the pressure field, are outlined together with those principal theoretical approaches to the estimation of the resultant response which are available to aid the designer. (Author)
AD-643 696 HC$3.00 MF$0.65

STABILITY OF ELASTIC PLATES UNDER RANDOM MEMBRANE STRESS.
Interim rept.,
Technische Hochschule, Vienna (Austria). Institut fuer Mechanik (II).
H. Parkus. 1 Oct 65, 6p
AFOSR-66-2110
Contract AF 61 (052)-645
Availability: Published in Bull Acad Polon Sci Ser Sci Tech v14 n2 p93-6 1966.

Descriptors: (*Structural parts, Stability), Elasticity, Stresses, Metal plates.

The note is concerned with the following problem. A purely elastic thin plate is subjected to self-equilibrating stresses acting in its plane with random intensity and random distribution. Such stress systems may, for instance, be created if an initially stress-free plate is placed in a medium whose temperature is a random function of space. If sufficiently large compressive stresses occur in the plate, the equilibrium may become unstable and the plate may buckle. The question then arises as to the probability that - the statistical properties of the stress field being given - the plate will remain in a position of stable equilibrium. (Author)
AD-643 697 Not available from CFSTI.

FUNDAMENTAL SKIN EFFECT IN ANISOTROPIC SOLID MECHANICS.
Interim rept.,
Biot (M. A.), New York.
M. A. Biot. 21 Feb 66, 22p
AFOSR-66-2628
Contract AF 49 (638)-1329
Availability: Published in Int. J. Solids Structures v2 p645-63 1966.

Descriptors: (*Solids, *Mechanics), (*Stresses, *Surface properties), Anisotropy, Buckling (Mechanics), Mechanical waves, Propagation, Elasticity, Theory; Sandwich construction, Fibers.
Identifiers: Skin effect.

It is shown that in solid mechanics a skin effect is associated with anisotropy. Near a free surface or a surface of discontinuity certain components of the stress field vary rapidly from zero to a maximum within a thin skin. The thickness of this skin tends to vanish for increasing anisotropy. A stress concentration also occurs whereby certain stress components are amplified within the skin thickness. The analysis is carried out for a medium with or without initial stress and includes the case of surface instability, internal buckling and surface wave propagation. The results presented in the context of elasticity theory are on the whole valid for viscoelastic media by the principle of correspondence. The results are also applicable to multilayered or fibrous compound materials which, on the average, behave approximately as anisotropic continuous media. (Author)
AD-643 716 Not available from CFSTI.

THE APPLICATION OF THE SMOOTH-SURFACE INTERPOLATION TECHNIQUE TO THE FINITE-ELEMENT ANALYSIS OF THIN PLATES,
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab.
Alexander L. Deak, and Theodore H. H. Pian. Aug 66, 56p MIT-ASRL-136-2
AFOSR-66-2044
Grants AF-AFOSR-347-64, AF-AFOSR-347-65

Descriptors: (*Structural parts, Bending), Interpolation, Surfaces, Functional analysis, Vibration, Aeroelasticity.

The report introduces two new developments concerning the finite-element displacement method for analysis of plate bending. Both are restricted to plates which are subdivided to rectangular meshes. The first analysis makes use of the twelve degrees of freedom stiffness and mass matrices which are derived based on the fully compatible smooth-surface interpolation functions developed recently by Birkhoff and Garabedian. The second development is a modified displacement method which through the spline-interpolation procedure reduces the order of the associated matrices by eliminating the first derivatives at the nodes as generalized coordinates. Numerical results are included for both static and free vibration problems. (Author)
AD-643 870 HC$3.00 MF$0.65

WEAR RESISTANCE OF ALLOYS FOR GAS TURBINE INSTALLATIONS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 11F.
AD-643 876 HC$3.00 MF$0.65

METHOD FOR DETERMINING BUCKLING LOADS OF CIRCULAR STIFFENING RINGS, INCLUDING CONSIDERATION OF TORSIONAL DISPLACEMENT.
Rept. for Jun-Sep 66,
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
Larry E. Farmer. Dec 66, 33p AEDC-TR-66-188
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Rings, Buckling (Mechanics)), (*Structural shells, Loading (Mechanics)), Stiffened cylinders, Torsion, Cylindrical bodies, Pressure, Structural shells, Stability, Deflection.

A solution for the buckling loads of free rings is incorporated into an elementary analysis of ring-cylindrical shell interaction to obtain a method for computing external shell pressures which result in instability of stiffening rings. The method developed includes torsional as well as radial stability in the rings. Shell restraint of the rings is assumed only in the direction of the shell axis at the ring-shell intersection. It is shown that torsional and 'in-plane' buckling are independent for rings which have cross-sectional symmetry about their diametral plane. Two example problems are shown.
AD-643 878 Not available from CFSTI.

THERMAL STRESSES IN AN ABLATING THICK-WALLED SPHERE.
Research rept.,
Polytechnic Inst. of Brooklyn, N. Y. Dept. of Aerospace Engineering and Applied Mechanics.
Fred P. Avril, Richard F. Parisse, and S. V. Nardo.Oct 66, 40p
PIBAL-930
Contract Nonr-839 (23)

Descriptors: (*Reentry vehicles, Structural properties), (*Thermal stresses, Spheres), Ablation, Elasticity, Thermal expansion, Strain (Mechanics), Hemispherical shells, Loading (Mechanics), Thermal conductivity.

A theoretical technique for predicting thermal stresses in a thick-walled ablating sphere of a low-conductivity material subjected to point-symmetric aerodynamic thermal and pressure loading is proposed. A previously developed approximate ablation analysis is combined with a known thermal stress solution for multi-layer spheres in order to determine stresses and strains in a material with variable modulus of elasticity and coefficient of linear thermal expansion. The multi-layer analysis is compared with a known thermoelastic solution for the incompressible sphere as a qualitative measure of the accuracy of this approach. The thermoelastic strains predicted are compared to the results of hypersonic wind tunnel strain measurements obtained on tests of ten Plexiglas and Nylon hemispherical models. For four of the models the agreement is good, while agreement for the other six models ranges from fair to poor.
AD-643 881 HC$3.00 MF$0.65

CERTAIN PERSPECTIVES FOR THE USE OF THE PULSE METHOD OF DETERMINING THE ELASTIC CONSTANTS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 14B.
AD-643 902 HC$3.00 MF$0.65

BUCKLING OF HEADS, CYLINDERS, AND RINGS.
Technical rept.,
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
Kenneth P. Buchert. Dec 66, 21p AEDC-TR-66-224
Contract AF 40 (600)-1200
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Elastic shells, Buckling (Mechanics)), (*Buckling (Mechanics), Cylindrical bodies), Rings, Spheres, Ellipsoids, Stiffened cylinders, Loading (Mechanics), Structural shells, Stability, Deflection.

The purpose of this report is to briefly review and summarize the research that has been accomplished on the buckling of shells and to develop practical methods of stability analyses that are applicable to large fabricated shell construction. The analyses are applicable to doubly curved shells (i.e., spheres, ellipsoids, dished heads, etc.), to stiffened and unstiffened cylinders, and to rings. Although the methods presented were specifically developed in the analysis of the Mark I - Aerospace Environmental Facility, they may be used to analyze the general class of shells constructed by the 'Heavy Plate Fabricators'. This general type of shell is fabricated in steel or aluminum, is relatively thick, has a relatively large radius of curvature, and is fabricated generally in accordance with the ASME-Section VIII-Unfired Pressure Vessel Code. Although the loading is basically caused by external pressure, such loadings as temperature variations and concentrated loads and moments are considered. The important effects of fabrication tolerances are also considered in the analyses.
AD-643 908 HC$3.00 MF$0.65

DIFFERENTIAL EQUATIONS OF A DISK OF ASYMMETRICAL PROFILE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yu. M. Shevchenko. 14 Jul 66, 11p FTD-TT-65-1949
Unedited rough draft trans. of Akademiya Nuak URSR, Kiev. Dopovidi n2 p180-4 1965.

Descriptors: (*Disks, *Strain (Mechanics)), Differential equations, Thermal stresses, Loading (Mechanics), Centrifugal fields, Elasticity, USSR.

An examination was made of the strained state of a disk of an asymmetrical profile as a round plate of variable thickness, which is situated in an axially symmetrical space temperature field under the effect of surface axially symmetrical load and centrifugal forces. (Author)
AD-643 923 HC$3.00 MF$0.65

NATURAL OSCILLATIONS AND STABILITY OF CONTINUOUS TRIPLE-LAYER PLATES WITH LIGHT FILLER,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 13M.
AD-643 928 HC$3.00 MF$0.65

INVESTIGATION OF NON-STATIONARY OSCILLATIONS IN NONLINEAR SYSTEMS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Yu. A. Mitropolskii. 30 Aug 66, 57p FTD-MT-65-117
TT-67-60264
Edited machine trans. of mono. Prilozheniya Metodov Teorii Nelineinykh Kolebanii k Zadacham Fiziki i Tekhniki, v3, Kiev, 1963 p241-74.

Descriptors: (*Oscillation, *Nonlinear systems), Resonance, Numerical analysis, Asymptotic series, USSR.

A method is described of investigation of nonstationary oscillatory processes in nonlinear systems with slowly varying parameters. The problem of passing through resonance in nonlinear oscillatory systems with one and more degrees of freedom is considered in detail as well as the problem of passing through parametric resonance and some other typical problems of physics and technics connected with nonstationary oscillations (resonance phenomena in accelerators, passing through resonance in gyroscopic systems, etc.). (Author)
AD-643 960 HC$3.00 MF$0.65

APPROXIMATE CALCULATIONS OF ELASTIC-PLASTIC THIN SHELL THEORY,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 13M.
AD-643 970 HC$3.00 MF$0.65

REFINED SOLUTION OF THE PROBLEM OF THE BENDING OF A FLEXIBLE SQUARE PLATE WITH HINGE SUPPORTED EDGES UNDER THE ACTION OF NORMAL PRESSURE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. V. Zakirov. 18 Aug 66, 8p FTD-TT-65-2020
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) n1 p28-31 1959.

Descriptors: (*Structural parts, Bending), Flat plate models, Flexible structures, Supports, Loading (Mechanics), Pressure, Differential equations, USSR.

Consideration is given to a hinge-supported square plate with a uniformly distributed normal load q. The edges of the plate remain rectilinear at the time of the deformation, their approach during the bending being restricted by elastic rods (cross bracing). The problem is solved by the Bubnov-Galerkin method. (Author)
AD-643 999 HC$3.00 MF$0.65

A BOUNDARY PROBLEM CONNECTED WITH THE CALCULATION OF A PRISMATIC ELASTIC SHELL OF VARIABLE THICKNESS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
Jalal Kasymov. 23 Sep 66, 26p FTD-TT-65-1800
TT-67-60295
Edited trans. of Azerbaidzhanskii Gosudarstvennyi Univ. Uchennye Zapiski. Elmi Eserler (USSR) n7 p3-21 1956.

Descriptors: (*Elastic shells, Prismatic bodies), (*Boundary value problems, Elastic shells), Elasticity, Stresses, Green's function, Tensor analysis, Integral equations, USSR.

The article lists briefly the basic propositions of the mathematical theory of elasticity, and elucidates the mathematical difficulties connected with the calculation of shells. Using the method proposed by Professor I. N. Vekua, a system of equations is set up which characterizes approximately the stressed state of a prismatic elastic shell of variable thickness. This system of equations can be reduced, for the zero approximation, to the treatment of a boundary problem: in some connected region S bounded by a smooth contour L. This problem can be divided into two boundary problems, one of which can be solved in the usual manner using Green's function for the Laplacian operator. The other problem can be solved by means of matrix-vector notation and, by applying Green's tensor, can be reduced to an integrodifferential equation in matrix-vector form. Finally, by integrating them by parts, the final equations are reduced to a system of integral equations of the Fredholm type.
AD-644 001 HC$3.00 MF$0.65

SECOND ALL UNION SYMPOSIUM ON THE PROPAGATION OF ELASTIC PLASTIC WAVES IN SOLID MEDIA,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. A. Tsurnal, Ya. F. Kayuk, and V. N. Buyvol.
7 Oct 66, 6p FTD-HT-66-497
TT-67-60285
Unedited rough draft trans. of Prikladnaya Mekhanika (USSR), v1 n3 p140-41 1965.

Descriptors: (*Mechanical waves, Symposia), (*Scientific research, Mechanical waves), Elasticity, Plasticity, Reports, Shock waves, Propagation, Solids, Viscosity.
AD-644 023 HC$3.00 MF$0.65

DEFORMATION ANALYSIS OF A CIRCULAR COUPLED-PLATE STRUCTURE,
Argonne National Lab., Ill.
H. Halle. Mar 66, 27p
Contract W-31-109-eng-38

Descriptors: (*Structures, Deformation), (*Metal plates, Loading (Mechanics)).

For abstract, see NSA 20 24.
ANL-7145 HC$3.00 MF$0.65

DYNAMIC RESPONSE OF BUCKLED STIFFENED PANELS TYPICAL OF S-II STAGE FORWARD SKIRT UNDER ACOUSTIC LOADS INTERIM REPORT.
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
C. L. Amba-rao. Mar 66, 18p NASA-CR-79532, WR-66-19
Contract NAS8-20073
Prepared For Brown Eng. Co.

Descriptors: *Compression loading, *Dynamic response, *Stiff structure, Acoustic, Buckling, Compression, Differential, Dynamic, Equation, Loading, Motion, Panel, Plate, Response, Stiffness, Stress, Structure.

For abstract, see STAR 05 02.
N67-11685 HC$3.00 MF$0.65

TRANSFER MATRICES AND STIFFNESS MATRICES FOR UNIFORM BEAMS.
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
R. W. White. Nov 65, 38p NASA-CR-79533, WR-65-31
Contract NAS8-5384

Descriptors: *Matrix, *Structural beam, *Vibration, Beam, Calculus, Deflection, Deformation, Force, Inertia, Load, Rotary, Shear, State, Steady, Stiffness, Structural, Transfer, Uniform, Warp.

For abstract, see STAR 05 02.
N67-11686 HC$3.00 MF$0.65

DYNAMIC RESPONSE OF BUCKLED STIFFENED PANELS TYPICAL OF S-II STAGE FORWARD SKIRT UNDER ACOUSTIC LOADS FINAL REPORT.
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
C. L. Amba-rao. Jun 66, 61p NASA-CR-79536, WR-66-36
Contract NAS8-20073
Prepared For Brown Eng. Co.

Descriptors: *Acoustic vibration, *Dynamic response, *Saturn s- ii stage, *Stiff structure, Acoustic, Buckling, Compression, Deflection, Dynamic, Load, Mechanics, Panel, Postbuckling, Response, Stiffness, Strain, Structure, Uniaxial, Vibration.

For abstract, see STAR 05 02.
N67-11692 HC$3.00 MF$0.65

ANALYSIS OF GENERAL STRUCTURAL NETWORKS BY MATRIX METHODS.
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
R. W. White. Nov 65, 30p NASA-CR-79507, WR-65-30
Contract NAS8-5384

Descriptors: *Composite structure, *Linear system, *Matrix analysis, *Network analysis, Analysis, Application, Complex, Component, Computer, Electric, Linear, Matrix, Mechanical, Method, Network, Structure, System, Transfer.

For abstract, see STAR 05 02.
N67-11730 HC$3.00 MF$0.65

A METHOD FOR PRELIMINARY ESTIMATION OF FATIGUE STRENGTH IN AIRCRAFT PRIMARY STRUCTURES.
Saab Aircraft Co., Linkoping (Sweden).
For primary bibliographic entry see Field 1C.
For abstract, see STAR 05 02.
N67-11754 HC$3.00 MF$0.65

ANALYSES OF COMPOSITE STRUCTURES.
Aeronutronic, Newport Beach, Calif.
D. F. Adams, D. R. Doner, and S. W. Tsai. Nov 66, 233p NASA-CR-620
Contract NAS7-215

Descriptors: *Composite structure, *Cylinder, *Laminate, *Yield strength, Analysis, Composite, Computer, Cross, Flat, Helix, Material, Multilayer, Ply, Program, Stiffness, Strength, Structure, Winding, Yield.

For abstract, see STAR 05 02.
N67-11948 HC$3.00 MF$0.65

RESEARCH STUDY TO PROVIDE CONCEPTS OF PANEL ATTACHMENT MECHANISMS SUITABLE FOR REFURBISHABLE PANEL APPLICATION.
Martin Co., Baltimore, Md.
R. E. Rieckmann. Nov 66, 86p NASA-CR-640
Contract NAS1-5253

Descriptors: *Nuts and bolts, *Panel, *Spacecraft shielding, Ablation, Attachment, Bolt, Entry, Heat, Lift, Man, Material, Mechanism, Nut, Replacement, Shielding, Spacecraft, Structure, System, Vehicle.

For abstract, see STAR 05 02.
N67-11950 HC$3.00 MF$0.65

METHOD OF RELATING MODEL DAMPING TO LOCAL DAMPERS IN LUMPED PARAMETER SYSTEMS.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
D. I. Drain, and H. J. Koenig. Dec 66, 32p
NASA-TN-D-3637
Contract 180-31-01-01-22

Descriptors: *Launch vehicle, *Longitudinal control, *Vibration damping, Aerodynamics, Algebra, Approximation, Characteristics, Control, Damper, Damping, Launch, Longitudinal, Lumping, Mode, Motion, Parameter, Relation, Section, System, Vehicle, Vibration.

For abstract, see STAR 05 02.
N67-11955 HC$3.00 MF$0.65

PHOTOMECHANICAL INVESTIGATION OF STRUCTURAL BEHAVIOR OF GYROSCOPE COMPONENTS. TASK IV - ANALYSIS OF INITIAL REDESIGN OF AB5-K8 GYROSCOPE.
Allied Research Associates, Inc., Concord, Mass.
H. Becker, F. F. Bird, P. E. Kyle, R. Papirno, and C. N. Tang. Apr 66, 59p NASA-CR-80060, ARA-284-8
Contract NAS8-11294

Descriptors: *Gyroscope, *Photomechanics, *Structural design, Analysis, Beam, Behavior, Beryllium, Component, Deflection, Design, Elastic, Elementary, Fork, Limit, Load, Material, Optimization, Plasticity, Precision, Prediction, Shaft, Shock, Structural, Temperature, Theory, Thermal, Transient.

For abstract, see STAR 05 02.
N67-12048 HC$3.00 MF$0.65

PHOTOMECHANICAL INVESTIGATION OF STRUCTURAL BEHAVIOR OF GYROSCOPE COMPONENTS. TASK V - MATERIALS AND DESIGN DATA.
Allied Research Associates, Inc., Concord, Mass.
H. Becker, P. E. Kyle, R. Papirno, and C. N. Tang. Sep 66, 60p NASA-CR-80059, ARA-284-1
Contract NAS8-11294

Descriptors: *Accelerator, *Gyroscope, *Metallurgy, *Plasticity, Beryllium, Corrosion, Deformation, Design, Electron, Fork, Humidity, Mechanical, Metallography, Optical, Optimization, Property, Temperature, Test.

For abstract, see STAR 05 02.
N67-12049 HC$3.00 MF$0.65

PROGRAM FOR THE EVALUATION OF STRUCTURAL REINFORCED PLASTIC MATERIALS AT CRYOGENIC TEMPERATURES FINAL REPORT, 1 JUL. 1963 - 1 JUL. 1966.
Goodyear Aerospace Corp., Akron, Ohio.
T. J. Boller, I. R. Butcher, A. H. Kariotis, L. W. Toth, and F. D. Yoder. 31 Aug 66, 239p NASA-CR-80061, GER-12792
Contract NAS8-11070

Descriptors: *Cryogenics, *Plastic material, Reinforcement, Cryogenic, Material, Mechanical, Performance, Plastic, Strength, Structural, Temperature, Testing, Thermal.

For abstract, see STAR 05 02.
N67-12051 HC$3.00 MF$0.65

DAMPING CAPACITY OF MATERIALS, VOLUME I.
Battelle Memorial Inst., Columbus, Ohio.
R. E. Maringer. 3 Jan 66, 390p NASA-CR-80143, RSIC-508, VOL. I
Contract DA-01-021-AMC-11706/Z/
Center, 3 Jan. 1966 390 P Refs Jointly Supported By Nasa

Descriptors: *Bibliography, *Damping, *Materials science, Annotation, Capacity, Friction, Fundamental, Internal, Material, Measuring, Mechanism, Method, Pendulum, Property, Pulse, Resonance, Science, System, Torsion, Ultrasonic.

For abstract, see STAR 05 02.
N67-12059 HC$3.00 MF$0.65

DAMPING CAPACITY OF MATERIALS, VOLUME II.
Battelle Memorial Inst., Columbus, Ohio.
R. E. Maringer. 3 Jan 66, 391p NASA-CR-80144, RSIC-508, VOL. II
Contract DA-01-021-AMC-11706/Z/
Center, 3 Jan. 1966 391 Refs Jointly Supported By Nasa

Descriptors: *Bibliography, *Damping, *Internal friction, Capacity, Computer, Friction, Internal, Material, Measurement, Metal, Search, Technique.

For abstract, see STAR 05 02.
N67-12060 HC$3.00 MF$0.65

EXPERIMENTAL DETERMINATION OF SYSTEM PARAMETERS FOR THIN-WALLED CYLINDERS THIRD ANNUAL SUMMARY REPORT, JUL. 1965 - 31 AUG. 1966.
Republic Aviation Div., Fairchild Hiller Corp., Farmingdale, N. Y.
M. J. Forray, and R. S. Levy. 31 Aug 66, 101p NASA-CR-79758, FHR-1117-20
Contract NAS8-11514

Descriptors: *Computer program, *Elastic cylinder, *Mode shape, *Natural frequency, Computer, Cylinder, Digital, Elastic, Equation, Equilibrium, Frequency, Mass, Mode, Motion, Natural, Prediction, Pressure, Program, Shape, Test, Thin, Vibration, Wall, Weight.

For abstract, see STAR 05 02.
N67-12083 HC$3.00 MF$0.65

COMPUTER PROGRAM FOR THE ANALYSIS OF FILAMENT-REINFORCED METAL-SHELL PRESSURE VESSELS.
Aerojet-general Corp., Azusa, Calif. Computing Sciences Div.
F. J. Darms. May 66, 410p NASA-CR-72124
Contract NAS3-6292

Descriptors: *Computer program, *Fortran, *Metal shell, *Pressure vessel, *Reinforcing fiber, Analysis, Calculation, Computer, Cylinder, Design, Equation, Equilibrium, Fiber, Head, Metal, Pressure, Program, Reinforced, Shell, Strain, Structure, Temperature, Vessel.

For abstract, see STAR 05 02.
N67-12097 HC$3.00 MF$0.65

DEVELOPMENT OF NON-DESTRUCTIVE METHODS FOR DETERMINING RESIDUAL STRESS AND FATIGUE DAMAGE IN METALS ANNUAL REPORT, 9 JUL. 1965 - 8 JUL. 1966.
Benson (Robert W.) And Associates, Inc., Nashville, Tenn.
R. W. Benson. 30 Jun 66, 66p NASA-CR-79304, MPR-12
Contract NAS8-20288

Descriptors: *Metal fatigue, *Nondestructive testing, *Stress distribution, *Structural material, Attenuation, Corrosion, Distribution, Electromagnetic, Failure, Fatigue, Friction, Internal, Material, Mechanical, Metal, Nondestructive, Residual, Resistivity, Stress, Structural, Testing, Ultrasonic, Wave.

For abstract, see STAR 05 02.
N67-12227 HC$3.00 MF$0.65

MASS LOADING EFFECTS ON LOCALIZED VIBRATORY ENVIRONMENTS OF ROCKET VEHICLES TECHNICAL SUMMARY REPORT, 30 JUN. 1965 - 31 JUL. 1966.
North American Aviation, Inc., Downey, Calif. Structures And Dynamics Dept.
S. Y. Lee, and S. S. Tang. 20 Jul 66, 274p NASA-CR-79512, SID-66-1201
Contract NAS8-20019

Descriptors: *Rocket vehicle, *Vibratory loading, Beam, Coupling, Distribution, Environment, Excitation, Force, Loading, Mass, Plate, Response, Rocket, Structure, Vehicle, Vibration.

For abstract, see STAR 05 02.
N67-12236 HC$3.00 MF$0.65

MATRIX SOLUTION OF SHELLS OF ARBITRARY SHAPE SUBJECTED TO ARBITRARY DYNAMIC LOADING FINAL REPORT.
Denver Research Inst., Colo.
R. Szilard. Aug 66, 82p NASA-CR-80114, EPT.-626-6607-F
Grant NSG-518, Contract DRI-626-6607-F

Descriptors: *Dynamic load, *Matrix analysis, *Shell theory, Analysis, Arbitrary, Coefficient, Convergence, Dynamic, Free, Frequency, Load, Matrix, Problem, Shape, Shell, Solution, Stiffness, Theory, Vibration.

For abstract, see STAR 05 02.
N67-12263 HC$3.00 MF$0.65

THERMAL STRESSES IN INFINITE FLAT PLATES.
Lawrence Radiation Lab., Univ. of California, Berkeley.
Bradley M. Johnston. 30 Jun 66, 50p

Descriptors: (*Thermal stresses, Metal plates), (*Structural parts, Thermal stresses).

For abstract, see NSA 20 24.
UCRL-14737 HC$3.00 MF$0.65

20L. SOLID STATE PHYSICS

EFFECT OF SPIN-ORBIT SCATTERING ON THE UPPER CRITICAL FIELD OF HIGH-FIELD SUPERCONDUCTORS,
Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.
For primary bibliographic entry see Field 20C.
AD-643 547 Not available from CFSTI.

DISPERSIVE MAGNETO-OPTICAL PHENOMENA IN SEMICONDUCTORS IN CROSSED MAGNETIC AND ELECTRIC FIELDS,
Massachusetts Inst. of Tech., Cambridge. National Magnet Lab.
W. Zawadzki, Q. H. F. Vrehen, and B. Lax. 14 Mar 66, 11p JP-194
AFOSR-66-2214
Contract AF 49 (638)-1468
Availability: Published in Physical Review v148 n2 p849-57 Aug 12 1966.

Descriptors: (*Field theory, Semiconductors), (*Magneto-optic effect, *Semiconductors), Crossed field devices, Electron transitions, Germanium, Anisotropy.

The semiclassical and quantum theories of the Faraday and Voigt effects due to transitions between two simple energy bands in the presence of crossed magnetic and electric fields are developed. The dispersive phenomena are found to complement and augment the information obtained from absorption. The decrease of intensity of delta n=0 transitions, the finite probability of transitions with delta n does not equal 0, and the shift of transitions to lower energies are found here, as they were in the optical absorption. The absorption constant due to second-order (forbidden) transitions is calculated and anisotropy with respect to electric-field direction is predicted. The experimental results of crossed-field Faraday rotation in germanium are presented and comparison with the theory is carried out, taking into account the degeneracy of the valence band. Good correlation between the theory and the experiment is obtained. (Author)
AD-643 550 Not available from CFSTI.

PHOTOELECTRIC EFFECTS IN THE SILVER HALIDES.
Cornell Univ., Ithaca, N. Y.
For primary bibliographic entry see Field 20C.
AD-643 553 Not available from CFSTI.

OSCILLATIONS AND HOT CARRIER EFFECTS IN THE PHOTOCONDUCTIVITY OF n-TYPE InSb.
Technical rept., 1 Oct 65-30 Sep 66,
Purdue Univ., Lafayette, Ind. Dept. of Physics.
V. J. Mazurczyk, G. V. Ilmenkov, and H. Y. Fan. 13 Apr 66, 4p
Contract Nonr-1100 (27)
Availability: Published in Physics Letters v21 n3 p250-2 May 15 1966.

Descriptors: (*Indium alloys, Antimony alloys), (*Photoconductivity, *Semiconductors), Carriers (Semiconductors), Oscillation, Electric fields.

Oscillation of the intrinsic photoconductivity with wavelength was observed in n-type InSb. Interpretation is given taking into account carrier trapping. Additional hot carrier effects were found in the dependence of photoconductivity on the applied electric field. (Author)
AD-643 572 Not available from CFSTI.

ENERGY STRUCTURE OF ALUMINUM ANTIMONIDE ZONES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20B.
AD-643 624 HC$3.00 MF$0.65

UKRAINIAN JOURNAL OF PHYSICS, VOL. 10, NO. 6: SELECTED ARTICLES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
L. K. Chubova, M. P. Gavaleshko, S. G. Tresvyatskii, and N. D. Nazarenko. 7 Dec 66, 19p FTD-HT-66-218
TT-67-60207
Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v10 n6 p630-35, 671-81 1965.

Descriptors: (*Single crystals, Physical properties), (*Whiskers (Crystals), *Magnesium oxides), (*Mercury compounds, Single crystals), (*Tellurides, Single crystals), Semiconductors, Electromagnetic properties, Hall effect, Magnetic fields, Cryogenics, Fibers, Refractory materials, Crystal growth, Elongation, Mechanical properties, Rupture, USSR.
Identifiers: Mercuric telluride.

Contents: Galvanomagnetic properties of mercury telluride monocrystals, by L. K. Chubova, M. P. Gavaleshko, V. V. Yeremenko; Derivation and properties of fibrous magnesium oxide crystals, by S. G. Tresvyatskii, N. D. Nazarenko, et al.
AD-643 638 HC$3.00 MF$0.65

EFFECT OF A COPPER ADMIXTURE ON ELECTRICAL PROPERTIES OF InSb.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. D. Berkeliev, V. V. Galavanov, and D. N. Nasledov. 8 Dec 66, 8p FTD-HT-66-538
TT-67-60206
Vliyanie Primesi Medi na Elektricheskie Svoestva InSb, unedited rough draft trans. of Akademiya Nauk Turkmenskoi SSR, Ashkhabad. Izvestiya. Seriya Fiziko-Tekhnicheskikh, Khimicheskikh i Geologicheskikh Nauk, n4 p105-7 1965.

Descriptors: (*Indium alloys, Antimony alloys), (*Semiconductors, Indium alloys), Copper, Diffusion, Electrical properties, Electron density, Carriers (Semiconductors), Annealing, Conductivity, USSR.

Some results of electrical properties of p-InSb crystals, obtained by the diffusion of copper into n-type crystals, are given. A table is given of concentration values N and mobility U of current carrying samples at 78K before and after diffusion annealing. It is shown on the table that samples with electron concentrations of 2--4.10 to the 13th power/cu cm change the type of conductivity at a temperature of 260C, and in samples with electron concentrations of 8.10 to the 13th power/cu cm the change in conductivity type takes place at a temperature of 300C. It is pointed out that investigations have shown that annealing of samples in a vacuum and in an argon atmosphere gives the same result. Samples of p-type with a low concentration of holes and sufficiently high mobility can be obtained by the diffusion of copper into n-InSb. (Author)
AD-643 640 HC$3.00 MF$0.65

STUDY FOR GENERALIZED MODEL FOR SEMICONDUCTOR RADIATION RESPONSE PREDICTION.
Quarterly progress rept. no. 6, 15 Jun-14 Sep 66,
Nortronics, Newbury Park, Calif.
James P. Raymond, and Robert E. Johnson. Dec 66, 100p ARD-66-62R
ECOM-00423-6
Contract DA-28-043-AMC-00423 (E)

Descriptors: (*Semiconductor devices, *Radiation damage), (*Transistors, Radiation damage), (*Integrated circuits, Radiation damage), Resistors, Semiconductors, Transients, Mathematical models, Mathematical prediction.

The saturation-inclusive bipolar transistor representation has been refined and written into a computer code to allow detailed comparison of analytical and experimental results. Electrical and radiation-induced saturated switching responses have been calculated from electrical parameter measurements. The agreement between calculated and experimental results is good. The lumped-model analysis of the monolithic circuit elements has been extended to the detailed qualitative characteristics of junction-isolated and dielectrically-isolated resistor and transistor elements. Comparison is made between the results of the lumped-model analysis and known solutions of the differential equation representation of the devices. (Author)
AD-643 652 HC$3.00 MF$0.65

MATERIALS SCIENCES RESEARCH.
Progress rept. no. 5, 1 Oct 65-30 Sep 66.
Purdue Univ., Lafayette, Ind.
1 Nov 66, 128p

Descriptors: (*Materials, Scientific research), (*Semiconductors, Scientific research), Physical properties, Solid state physics, Band theory of solids, Cyclotron resonance phenomena, Transport properties, Magnetic properties, Ultrasonic radiation, Crystal structure, Thermodynamics, Electrical properties, Films, Chemical reactions, Cryogenics, Propagation.

A report is made of fundamental studies of structure and properties of metals, ionic solids, and semiconductors, and of molecular theory of materials.
AD-643 715 HC$3.00 MF$0.65

SOLID STATE IMAGE INTENSIFIERS.
Westinghouse Electric Corp., Elmira, N. Y. Electronic Tube Div.
For primary bibliographic entry see Field 9A.
AD-643 717 HC$3.00 MF$0.65

MICROHARDNESS OF SOME COMPLICATED DIAMOND-LIKE SEMICONDUCTORS,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. S. Borshchevskii, N. K. Takhtareva, and D. N. Tretyakov. 27 Jun 66, 5p FTD-HT-66-114
TT-67-60260
Unedited rough draft trans. of Nauchnaya Konferentsiya Molodykh Uchenykh Moldavii (no. 3). Yestestvenno-tekhnicheskie Nauki. Trudy (USSR) n1 p10 1964.

Descriptors: (*Semiconductors, Hardness), USSR, Solid solutions, Intermetallic compounds, Chemical bonds.

A series of semiconductor heterovalent compounds (divalent and trivalent) forming five developed iso-electronic series were prepared. The members of these series have the diamond, zinc blends, and chalcopyrite structures or ones close to them. The general tendence of change in microhardness in these series is a lowering with a gain in ionic quality. Measurements on monocrystalline objects apparently will provide the possibility of refining this conformity to law. The qualitative consideration of the dependence of the microhardness on the composition in the isovalent solid solutions of diamond-like substances enables one to draw the following conclusion: this dependence is reflected by a smooth curve (in accordance with Kurnakov's law.) As is shown by observation in the majority of the systems this maximum will shift in the direction of the harder component.
AD-643 735 HC$3.00 MF$0.65

OPTICAL PROPERTIES OF METALS AND SEMICONDUCTING MATERIALS.
Navy Electronics Lab., San Diego, Calif.
For primary bibliographic entry see Field 11F.
AD-643 755 HC$3.00 MF$0.65

PHENACITE-SPINEL TRANSITION IN LiAlGeO4.
Revised ed.,
Chicago Univ., Ill. Dept. of the Geophysical Sciences.
A. M. Gaines, A. J. Perrotta, and D. A. Stephenson. 30 Jun 66, 1p
Grant NSF-GP-2695
Revision of manuscript submitted 25 May 66.
Availability: Published in Journal of the American Ceramic Society v49 n9 p516 Sep 1966.

Descriptors: (*Germanium compounds, *Phase studies), (*Spinels, Phase studies), Lithium compounds, Aluminum compounds, Temperature, Pressure, Enthalpy, Transformations, Phase diagrams.
Identifiers: Germanates, Lithium aluminogermanate, Phenacites.

Since a phenacite-spinel transition was observed in LiZnVO4 at high pressures it was expected that similar transitions might be observed in silicates. Although the high-pressure experiments with alpha-eucryptite have been unsuccessful, this paper reports the successful conversion of the corresponding germanate (LiAlGeO4) to the spinel structure. (Author)
AD-643 790 Not available from CFSTI.

THEORY OF ELECTRON TRANSPORT PROCESSES IN TUNNEL DIODES.
Doctoral thesis,
Illinois Univ., Urbana. Dept. of Computer Science.
Michael Faiman. 19 Sep 66, 67p Rept. no. 214
Contract Nonr-1834 (15)

Descriptors: (*Tunnel diodes, *Band theory of solids), Electrons, Transport properties, Tunneling (Electronics), Quantum statistics, Integrals, Electric currents.

A unified theory of conduction processes in tunnel diodes is presented. The use of Fermi-Dirac distributions in non-equilibrium tunneling integrals is justified. The direct tunneling mechanism is examined from two points of view and is shown to be described about equally well by either. In subsequent sections, indirect tunneling and the phenomena of excess and thermal currents are treated. (Author)
AD-643 825 HC$3.00 MF$0.65

THEORETICAL INVESTIGATIONS OF THE PENETRATION OF KILOVOLT IONS AND ATOMS IN SOLIDS.
Final rept., 1 May 62-1 May 66,
Battelle Memorial Inst., Columbus, Ohio.
Eugene M. Baroody. Jul 66, 50p
ARL-66-0149
Contract AF 33 (657)-8853

Descriptors: (*Ion bombardment, Penetration), (*Crystal lattices, Ion bombardment), (*Particle beams, Penetration), Interactions, Probability, Moments, Glass, Gases, Tungsten compounds, Oxides, Integral equations, Differential equations, Integral transforms, Elastic scattering, Radiation damage.

Major sections treat two distinct problems arising in the theory of ion penetration. In the first, the Boltzmann transport equation and the method of Mellin transforms are used to calculate moments of the range distribution of particles stopped by elastic collisions in a medium of randomly located target atoms when cross sections are products of factors depending on energy and angle separately. Results are given for inverse power repulsive potentials and, with additional approximations, for Coulomb potentials with Thomas-Fermi screening. The effect of having several kinds of stopping atoms is considered and comparisons with measurements on amorphous WO3 are included. The representation of range distributions by using moments in an Edgeworth series is also treated. The second problem, the spreading of weak disturbances in crystals, has a bearing on energy loss from focused collision sequences and similar questions. Detailed results are given for the energy loss from a disturbed atom in a simple cubic lattice with central and noncentral forces between nearest neighbors. These include the calculation of additional terms in the expansion which applies at long times. (Author)
D-643 834 HC$3.00 MF$0.65

SYNTHESIS OF NEW SOLID-STATE MATERIALS BY ULTRAHIGH PRESSURE TECHNIQUES.
Avco Corp., Wilmington, Mass. Avco Space Systems Div.
For primary bibliographic entry see Field 11B.
AD-643 861 HC$3.00 MF$0.65

ELASTIC SPECTRA OF TWO-DIMENSIONAL DISORDERED LATTICES. II. IMPURITIES WHICH ALTER THE INTERACTIONS.
Technical rept.,
Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.
Hin-Chiu Poon, and Arthur Bienenstock. Sep 66, 42p
ARPA-27
Contract SD-88
See also AD-627 638.

Descriptors: (*Solid solutions, Crystal lattices), (*Crystal lattices, Elasticity), Crystal lattice defects, Impurities, Approximation (Mathematics), Vibration, Relaxation time, Equations of motion.

Previous studies indicated that the virtual crystal approximation should not be valid for the determination of the elastic spectrum of a system of two or more dimensions in which impurities alter the interactions. In this paper, the failure of the virtual crystal approximation for such a system is demonstrated explicitly. In addition, the relationship between the failure of the virtual crystal approximation and the lifetimes of the elastic modes is discussed.
AD-643 866 HC$3.00 MF$0.65

MINIATURE SEMICONDUCTOR PRESSURE SENSOR,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 14B.
AD-643 931 HC$3.00 MF$0.65

THE EFFECT OF ADSORPTION OF GASES AND VAPORS ON THE WORK FUNCTION OF SEMICONDUCTORS WITH THE STRUCTURE OF ZINC BLENDE,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. A. Kirovskaya, I. S. Sazonova, and L. G. Maidanovskaya. 28 Sep 66, 13p FTD-HT-66-480
TT-67-60269
Unedited rough draft trans. of Sibirskii Fiziko-Tekhnicheskii Institut. Trudy (USSR) v43 p380-87 1964.

Descriptors: (*Semiconductors, Work functions), (*Germanium, Adsorption), (*Gallium arsenides, Adsorption), (*Copper compounds, Adsorption), Bromides, Gases, Oxygen, Hydrogen, Propenes, Vapors, Propanols, Carriers (Semiconductors), Catalysis, USSR.
Identifiers: Cupric bromide.

The work function of an electron from germanium (n-type), Gallium arsenide (n-type) and copper

bromide was studied in oxygen, hydrogen, propylene and vapors of isopropyl alcohol at different temperatures. A connection was revealed between the n-type state of the surface of these semiconductors and their adsorption capability with respect to oxygen. (Author)
AD-643 971 HC$3.00 MF$0.65

CERTAIN FOUR COMPONENTS OF A SEMICONDUCTIVE PHASE.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
O. V. Voitsekhivskyi. 27 Sep 66, 9p FTD-HT-66-173
TT-67-60291
Unedited rough draft trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR), v9 n7 p796-97 1964.

Descriptors: (*Semiconductors, Phase studies), Solid solutions, Hardness, Zinc alloys, Germanium alloys, Arsenic alloys, Indium alloys, Tin alloys, Antimony alloys, Copper alloys, Tellurium alloys, Cadmium alloys.

The report is a part of systematic investigations of four component semiconductive phases of changed composition of the type of solid displacement solutions within the limits of the crystallochemical group of diamonds and the object is to examine the nature of the reaction of certain semiconductor compounds, which have the structure of zinc blende and chalkopyrite.
AD-644 011 HC $3.00 MF$0.65

FLUX METHODS FOR TRANSPORT PROBLEMS IN SOLIDS WITH NONCONSTANT ELECTRIC FIELDS.
Pennsylvania State Univ., University Park. Dept. of Physics.
E. F. Pulver, and J. P. McKelvey. 18 Apr 66, 9p
AFOSR-66-2704
Grant AF-AFOSR-73-66
Availability: Published in Physical Review v149 n2 p617-25 Sep 16 1966.

Descriptors: (*Solids, Transport properties), Semiconductors, Electric fields, Diffusion, Recombination reactions, Charged particles, Carriers (Semiconductors), Numerical analysis.

Certain recently developed methods for the solution of one-dimensional steady-state transport problems, based on flux conservation in diffusion-recombination systems involving charged particles, were extended to cases where nonconstant electric fields act upon the particles of the system. In situations where the electric field is small enough so that the drift velocity is much less than the mean thermal speed, solutions for a system of coupled flux-conservation equations for the diffusion-recombination system can be obtained, by use of the WKB method of approximation. From these solutions, expressions which involve integrals containing the field can be derived for the reflection and transmission coefficients of a material layer of arbitrary thickness. For the case where recombination may be neglected, the solutions are exact. Iterative methods are presented for obtaining the reflection and transmission coefficients of a material layer of arbitrary thickness under conditions where the requirements for the validity of the WKB method are not fulfilled. (Author)
AD-644 075 Not available from CFSTI.

EVIDENCE FOR L BANDS IN NaCl.
Milan Univ. (Italy). Instituto di Fisica.
Paola Scarmelli, and Roberto Fieschi. 29 Dec 65, 6p
AFOSR-66-2707
Grant AF-EOAR-7-65
Prepared in cooperation with Parma Univ. (Italy), Instituto di Fisica.
Availability: Published in The Physical Review v145 n2 p622-5 May 13 1966.

Descriptors: (*Sodium chloride, *Band theory of solids), Thermoluminescence, Ionization, Color centers, Absorption spectrum, Italy.

NaCl crystals are investigated in the spectral range 200-800 millimicrons by photostimulated thermoluminescence and differential-absorption-spectrum measurements. Four weak bands are found on the high-energy side of the F band, which have the properties of L bands: weak absorption coefficient, high and temperature-independent ionization efficiency, ionization intensity roughly proportional to the concentration of F centers. Moreover, it is found that thermoluminescence is stimulated only by light absorbed by electron centers (K,F,K,L bands), not by V centers. (Author)
AD-644 078 Not available from CFSTI.

INDIRECT OPTICAL ABSORPTION OF AgCl-AgBr ALLOYS.
Illinois Univ., Urbana. Dept. of Physics.
Burdette L. Joesten, and Frederick C. Brown. 21 Mar 66, 9p
AROD-4928.4
Contract DA-31-124-ARO (D)-217
Availability: Published in Physical Review v148 n2 p919-27 Aug 12 1966.

Descriptors: (*Silver compounds, Absorption spectrum), Chlorides, Bromides, Optical properties, Cryogenics, Band theory of solids, Crystals.

High-resolution measurements of the optical absorption edge of pure crystals of AgBr and AgCl are in good agreement with the theory of phonon-assisted indirect transitions. The indirect optical absorption of AgCl-AgBr mixed crystals has been studied between 4.2 and 77K. At 4.2K, the addition of AgBr to AgCl causes the absorption edge to shift continuously from the pure AgCl threshold at 3.252 eV to the pure AgBr threshold at 2.691 eV. Above 5.7 mole % AgBr in AgCl, the absorption coefficient increases steeply to values considerably greater than that of pure AgBr at the same wavelength. The effect of the alloying on the pure-crystal absorption spectra is somewhat different for the two extremes of mixing. In AgBr-rich mixed crystals (>90 mole % AgBr in AgCl), a temperature-independent component with a sharp threshold is observed at an energy precisely halfway between the indirect phonon-emission and phonon-absorption thresholds (which still appear with phonon energy 0.0082 eV as in pure AgBr). This suggests that nonvertical transitions can occur in the alloy without the aid of phonons to conserve crystal momentum. The zero-phonon threshold is not so evident for dilute concentrations of AgBr in AgCl, where a weak shoulder and tail extends approximately 0.07 eV to longer wavelengths. Some comparison with theory is given, but present understanding of the band structure of alloys is rather incomplete. (Author)
AD-644 093 Not available from CFSTI.

'CURRENT-STRICTION' - A MECHANISM OF ELECTROSTRICTION IN MANY-VALLEY SEMICONDUCTORS.
Technical rept.,
Pennsylvania Univ., Philadelphia.
Philipp Kornreich, and Herbert Callen. Nov 66, 34p TR-30
Contracts NONR-551 (36), DA-28-043-AMC-01810 (E)

Descriptors: (*Semiconductors, *Electrostriction), Germanium, Silicon, Band theory of solids, Electric fields, Deformation, Mathematical models.

Electric fields applied to germanium produce deformations which are about 10,000 times as large as those expected from conventional electrostriction mechanisms. A model is presented which does not involve a polarization in real space but, like the current, is mediated by a shift of the electron distribution in reciprocal space. This field-induced shift increases the energy of the electrons within each valley, but the increase is largest in those valleys with smallest effective mass parallel to the field direction. It then becomes energetically favorable for the lattice to deform in such a way that the deformation potential lowers the energy of the high-curvature valleys at the expense of the low-curvature valleys. The magnitude, temperature-dependence, and angular dependence of this effect is calculated for n-type semiconductors. A much smaller effect in silicon than in germanium is found in good agreement with the observed magnitudes. The induced strain is a pure volume-preserving linear dilatation in silicon, whereas it is a pure shear in germanium. (Author)
AD-644 097 HC$3.00 MF$0.65

PARAMAGNETIC RESONANCE OF RARE EARTH IONS IN CERIUM OXIDE.
Hebrew Univ., Jerusalem (Israel). Dept. of Physics.
Y. Komet, W. Low, and R. C. Linares. 12 Nov 65, 4p
AFOSR-66-2734
Grant AF-EOAR-63-64
Availability: Published in Physics Letters v19 n6 p473-4 Dec 1 1965.

Descriptors: (*Cerium compounds, Solid solutions), (*Rare earth elements, *Electron spin resonance), (*Erbium, Electron spin resonance), (*Ytterbium, Electron spin resonance), (*Gadolinium, Electron spin resonance), Dioxides, Single crystals, Paramagnetic resonance, Absorption spectrum, Atomic energy levels.
Identifiers: Ceric oxide.

An investigation was made of the electron spin resonance spectra of Er (3+), Yb (3+) and Gd (3+) which were present as small impurities (less than 0.01%) in single crystals of CeO2. The electron spin resonance spectra were all measured at 20K and 290K at 3 cm wavelength. The most striking effect is the great similarities in the spectra of the same rare earth ions in ThO2 and CeO2, despite the fact that crystal lattice spacings differ by about 4%.
AD-644 133 Not available from CFSTI.

THEORETICAL INVESTIGATION OF ULTRASONIC ATTENUATION FOR FREE ELECTRONS IN THE PRESENCE OF A MAGNETIC FIELD.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
L. Flax. Nov 66, 35p NASA-TN-D-3723
Contract 129-02-05-09-22

Descriptors: *Free electron, *Magnetic field, *Mean free path, *Phonon, *Ultrasonic wave, *Wave attenuation, Attenuation, Electron, Field, Free, Graph, Longitudinal, Magnetic, Mean, Number, Path, Propagation, Relative, Sound, Table, Theory, Transverse, Ultrasonic, Value, Wave.

For abstract, see STAR 05 02.
N67-11810 HC$3.00 MF$0.65

EFFECT OF TENSILE STRESS ON CURRENT-CARRYING CAPACITY OF COMMERCIAL SUPERCONDUCTORS.
National Aeronautics And Space Administration. Lewis Research Center, Cleveland, Ohio.
W. R. Hudson. Nov 66, 14p NASA-TN-D-3745
Contract 129-02-05-11-22

Descriptors: *Current density, *Niobium alloy, *Superconductor, *Tensile stress, Alloy, Capacity, Critical, Current, Density, Effect, Helium, Liquid, Niobium, Ribbon, Stress, Temperature, Tensile, Tin, Wire, Zirconium.

For abstract, see STAR 05 02.
N67-11815 HC$3.00 MF$0.65

CRYSTAL SPECTROSCOPY AT THE JOHNS HOPKINS UNIVERSITY, SEPTEMBER 1966.
Johns Hopkins Univ., Baltimore, Md.
H. M. Crosswhite, and H. W. Moos. 1966, 46p
NASA-CR-79996
Grant NSG-361
Submitted For Publication

Descriptors: .*Crystal, *Ion, *Research project, *Spectroscopy, Absorption, Analysis, Energy, Excitation, Free, High resolution, Multiple, Phonon, Project, Research, State, Zeeman effect.

For abstract, see STAR 05 02.
N67-11842 HC$3.00 MF$0.65

HIGH-PERFORMANCE THERMIONIC CONVERTERS FINAL REPORT, 19 MAY 1965 - 19 JUL. 1966.
Electro-optical Systems, Inc., Pasadena, Calif. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
A. E. Campbell. 2 Sep 66, 181p NASA-CR-79388, EOS-6952-FINAL
Contracts NAS7-100, JPL-951225
Prepared For Jpl

Descriptors: *Cesium vapor, *Performance characteristics, *Test vehicle, *Thermionic converter, Cesium, Characteristics, Collector, Converter, Design, Electrode, Emitter, Fabrication, High performance, Material, Parallel, Parameter, Performance, Plane, Precision, Technology, Test, Thermionic, Vapor, Variable, Vehicle.

For abstract, see STAR 05 02.
N67-11843 HC$3.00 MF$0.65

RESEARCH PROGRAM ON PYROELECTRIC DETECTION TECHNIQUES AND MATERIALS PHASE II FINAL REPORT.
Sperry Microwave Electronics Co., Clearwater, Fla.
Dec 66, 77p NASA-CR-629
Contract NASW-974

Descriptors: *Dielectric material, *Pyroelectricity, *Radiation detector, Barium, Ceramics, Crystal, Detector, Dielectric, Evaluation, Glycine, Material, Parameter, Radiation, Sulfate, Thin film, Titanate.

For abstract, see STAR 05 02.
N67-11949 HC$3.00 MF$0.65

RADIATION EFFECTS ON SILICON QUARTERLY PROGRESS REPORT, 1 JUL. - 30 SEP. 1966.
General Dynamics Corp., San Diego, Calif. Special Nuclear Effects Lab.
J. A. Naber, and E. G. Wikner. 12 Oct 66, 10p
NASA-CR-80138, GACD-6249
Contract NAS7-289

Descriptors: *Electric conductivity, *Electron spin resonance, *Radiation effect, *Silicon, Annealing, Carrier, Conductivity, Effect, Electric, Electron, High purity, Irradiation, Lifetime, Microwave, Radiation, Resonance, Spin, Technique.

For abstract, see STAR 05 02.
N67-12164 HC$3.00 MF$0.65

FUNDAMENTAL RESEARCH IN SOLID STATE ENERGY CONVERSION PROCESSES SEMIANNUAL TECHNICAL SUMMARY REPORT NO. 6, 1 DEC. 1965 - 1 JUL. 1966.
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
1 Jul 66, 41p NASA-CR-80136
Grant NSG-496

Descriptors: *Energy conversion, *Optical property, *Photovoltaic conversion, *Solids, Antimonide, Cadmium, Conversion, Electrophotometry, Energy, Luminescence, Photovoltaic, Semiconductor, Solution, Sulfide, Telluride, Zinc.

For abstract, see STAR 05 02.
N67-12166 HC$3.00 MF$0.65

COMBINED INTERPOLATION SCHEME FOR TRANSITION AND NOBLE METALS.
Chicago Univ., Ill. Dept. Of Physics.
F. M. Mueller. 1965, 53p NASA-CR-80129
Grant NSG-352

Descriptors: *Energy band, *Interpolation, *Noble metal, *Transition element, Band, Calculation, Conduction, Element, Energy, Interaction, Metal, Noble, Resonance, Scheme, Transition.

For abstract, see STAR 05 02.
N67-12173 HC$3.00 MF$0.65

POSITIVE AND NEGATIVE ION MOTION IN THERMAL OXIDE ON SILICON BY RADIOCHEMICAL AND MOS ANALYSIS.
Case Inst. Of Tech., Cleveland, Ohio.
A. B. Kuper, C. J. Slabinski, and E. Yon. 1966, 17p NASA-CR-79727
Contract NGR-36-003-067
Submitted For Publication

Descriptors: *Failure mode, *Metal oxide, *N-type semiconductor, *Sodium bromide, Anion, Bromide, Capacitor, Contamination, Device, Failure, Interaction, Kinetics, Metal, Mode, Oxide, Potential, Radiochemistry, Semiconductor, Shift, Silicon, Sodium, Surface.

For abstract, see STAR 05 02.
N67-12228 HC$3.00 MF$0.65

CHARGE STORAGE EFFECTS IN MYLAR RESULTING FROM ELECTRON IRRADIATION, JUNE 1965 - JUNE 1966.
Research Triangle Inst., Durham, N. C.
J. R. Hauser, L. K. Monteith, and T. M. Royal.
Dec 66, 108p NASA-CR-656
Contract NAS1-5225

Descriptors: *Charge transfer, *Electron radiation, *Mylar, Capacitor, Charge, Decay, Depth, Discharge, Effect, Electron, External, Filling, Increase, Model, Phenomenon, Radiation, Space, Spontaneous, Transfer, Transport, Trapping.

For abstract, see STAR 05 02.
N67-12275 HC$3.00 MF$0.65

20M. THERMODYNAMICS

SOME ANALOGIES FROM CLASSICAL ANALYSIS IN THE THEORY OF HEAT CONDUCTION.
Interim rept.,
Harvard Univ., Cambridge, Mass.
D. V. Widder. 2 Sep 65, 15p
AFOSR-66-2136
Grant AF-AFOSR-393-63
Availability: Published in Archive for Rational Mechanics and Analysis v21 n2 p108-19 1966.

Descriptors: (*Thermal conductivity, Theory), Analog systems, Potential theory, Partial differential equations, Functions, Transformations (Mathematics), Heat transfer.

The theory of heat conduction exhibits many analogies with the theory of functions of a complex variable (or alternatively with potential theory). The analogies are emphasized to illuminate the structure of the former theory and to indicate directions for further research. Although most of the report would apply to a space of n space variables and one time variable, attention is restricted to the case n=1. (Author)
AD-643 475 Not available from CFSTI.

A PROPOSED CORRELATION SCHEME FOR GAS-FILM COOLING DATA.
Technical rept.,
Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
G. W. Haering. Aug 66, 32p AFAPL-TR-66-56

Descriptors: (*Film cooling, Gases), (*Engines + motors, Film cooling), Rocket motors, Heat transfer, Coolants, Effectiveness, Correlation techniques.

The cooling of air-breathing engines and rocket motors by gas film was studied by many investigators. Even at subsonic speeds, the correlations and empirical formulae of various investigators do not produce data that are in agreement. A correlating scheme is proposed which, although not perfect, does take into consideration the experimental data from several sources and the variables that make any such scheme extremely difficult. The report includes a brief history of gas-film cooling and a discussion of some of the major factors affecting gas-film cooling -- such factors as pressure gradients, injection geometry velocity mismatch of the coolant stream, and temperature ratio. Although a scheme is proposed, the inherent problems warrant further investigations. (Author)
AD-643 523 HC$3.00 MF$0.65

TEMPERATURE MEASUREMENTS ON ELECTRON AND ION BEAMS,
Hughes Research Labs., Malibu, Calif.
H. Heil, and B. Scott. Aug 66, 41p Scientific-2
AFCRL-66-769
Contract AF 19 (628)-4297
See also AD-625 451.

Descriptors: (*Electron beams, Temperature), (*Ion beams, Temperature), Measurement, Spectroscopy, Energy, Atomic energy levels, Distribution functions, Voltage, Plasma medium, Diodes, Vidicons.

The retarding potential method produced temperature measurement accuracies which are comparable to or better than those possible with the best pyrometers or thermocouples. The method is limited to a close-spaced planar diode, with a collimating magnetic field to avoid nonaxial forces. In addition, the complete hemisphere of angles in the distribution must contribute in order to yield the simple current-voltage relation i (v) = e to the v power; (v < 0). In contrast, the total energy distribution function for a Maxwellian reads i (v) = (1-v) e to the v power. It may be measured with an energy spectrometer which is sensitive to the total energy only. Such an instrument is described. In this case the source and spectrometer may be far apart. On its way to the spectrometer the beam may be accelerated, focused, or generally subjected to nonaxial forces. Furthermore, completeness of the angular distribution is not required. A graphical method for accurate temperature determination from a recorded energy spectrum is described. As examples, the electron spectrum from a vidicon gun with oxide coated cathode and the ion spectrum from the plasma of a plane parallel cesium diode are shown. (Author)
AD-643 532 HC$3.00 MF$0.65

ENTROPY IN NONEQUILIBRIUM STATISTICAL MECHANICS.
Interim rept.,
Aeronautical Research Associates of Princeton, Inc., N. J.
Arnold H. Kritz, and Guido Sandri. 1966, 10p
AFOSR-66-2643
Contract AF 49 (638)-1461
Availability: Published in Physics Today v19 n9 Sep 1966.

Descriptors: (*Entropy, Statistical mechanics), Thermodynamics, Theory, Gases, Transport properties, Reaction kinetics.

Nonequilibrium statistical mechanics aims at deriving from the first principles of microscopic dynamics an entropy theorem which guarantees the approach to thermodynamic equilibrium. Recent developments are reviewed with focus on the position currently held by the entropy principle. It is emphasized that in virtue of multiple time scale calculations, lowest order theory provides a fully satisfactory understanding of the systems characterized by repulsive two-body collisions. In particular, lowest order theory yields rigorously an entropy principle (the H-theorem). By contrast, the recent efforts to include three-particle interactions have not yet led to a satisfactory theory of irreversibility. Three-particle interactions are essential to understanding the transport properties of dense gases and the chemical reaction rates. (Author)

AD-643 586 — Not available from CFSTI.

NOTE ON THE APPLICATION OF A MONOTONE DECREASING FUNCTION TO HEAT CONDUCTION IN RADIATING GASES BY METHODS OF CONCENTRIC SPHERES.

Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.

For primary bibliographic entry see Field 20D.

AD-643 614 — Not available from CFSTI.

[illegible] OF THE EFFECTS OF [illegible] ON [illegible] CONVECTIVE HEATING.

Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.

James A. Fay. 1966. 12p

Contract Nonr-1841 (95); Grant AF-AFOSR-553-63

Availability: Published in Proceedings of International Symposium on Fundamental Phenomena in Hypersonic Flow p130-40 1966.

Descriptors: (*Atmosphere entry, *Heat transfer), Boundary reflection, Molecules, Hypersonic flow, Plasma sheaths, Aerodynamic heating, Boundary layer.

In the range of flight velocities up to 10 km/sec, the majority of convective heat transfer measurements are in reasonable agreement with theoretical calculations based upon the best estimates of transport properties, including plasma effects. For bodies less than 10 cm in base radius, continuum convective heating is probably the major source of heating for all flight velocities up to 15 km/sec. For larger bodies, radiative heating is of increasing importance, especially at lower altitudes. It appears possible that shock formation and ionization relaxation could occur simultaneously, typically at 80 km altitude for a 1 cm nose radius. Either transport of radiation discontinuity approximations within a radiation boundary layer occurs only at very low altitudes and only for large bodies. (Author)

[illegible] — Not available from CFSTI.

[illegible] OF [illegible] AND [illegible] IN [illegible] AIR. THE [illegible] OF [illegible] IN [illegible] OF [illegible] AND [illegible] IN [illegible] AIR.

Foreign Technology Div., Wright-Patterson AFB, Ohio.

For primary bibliographic entry see Field 20D.

AD-643 641 — HC $3.00 MF $0.65

[illegible] AND TWO-DIMENSIONAL [illegible] SYSTEMS.

California Univ., San Diego, La Jolla. Dept. of Physics.

For primary bibliographic entry see Field 20C.

AD-643 781 — HC $3.00 MF $0.65

ENTROPY CONCEPTS IN COMPLEX SYSTEMS.

Final rept.,

Laboratory for Electronics, Inc., Boston, Mass.

Jerome Rothstein. 30 Oct 66. 150p

AFOSR-66-2015

Contract AF 49(638)-1450

Descriptors: (*Entropy, Reviews), Complex variables, Quantum mechanics, Heat engines, Energy, Thermodynamics, Automata.

Contents: Intelligence and non-computability; An overview of the conference from an informational-organizational-operational viewpoint; The informational-organizational nature of entropy; How well-informed heat engines can refute theorems of their behavior; Literature references and abstracts of papers by the principal investigator relative to these investigations.

AD-643 617 — HC $3.00 MF $0.65

BIOENERGETICS.

Foreign Technology Div., Wright-Patterson AFB, Ohio.

For primary bibliographic entry see Field 6C.

AD-643 651 — HC $3.00 MF $0.65

JOURNAL OF ENGINEERING PHYSICS (SELECTED ARTICLES).

Foreign Technology Div., Wright-Patterson AFB, Ohio.

V. P. Isachenko, V. V. Vysotov, and A. V. Lykov. 29 Jul 66. 123p FTD-MT-66-307

TT-67-60287

Unedited rough draft trans. of Inzhenerno-Fizicheskiy Zhurnal (USSR), v7 n2 p117-19, 120-24 1964.

Descriptors: (*Porous metals, Cooling), (*Evaporation, Porous metals), Heat transfer, Mass transfer, Water, Metal plates, Gas flow, Thermal conductivity, USSR.

Identifiers: Evaporative cooling.

Contents: The question of heat and mass exchange during evaporation of water from a porous wall; by V. P. Isachenko and V. V. Vysotov; The method of investigating evaporation cooling with porous metallic bodies; by A. V. Lykov and Z. F. Martynova.

AD-644 011 — HC $3.00 MF $0.65

JOURNAL OF ENGINEERING PHYSICS (SELECTED ARTICLES).

Foreign Technology Div., Wright-Patterson AFB, Ohio.

F. D. Gunyanskiy, G. V. Kuznetsov, and F. B. Shein. 6 Aug 66. 127p FTD-MT-65-332

TT-67-60288

Edited machine trans. of Inzhenerno-Fizicheskii Zhurnal (USSR), v7 no.pb 57, [illegible] 1964.

Descriptors: (*Heat transfer, *Heaters), (*Combustion, *Turbulence), Gas flow, Thermodynamics, Methane, Oxygen, Flame propagation, USSR.

Contents: Investigation of influence of inlet conditions on heat exchange in the initial length of a pipe; by F. D. Gunyanskiy and G. V. Kuznetsov; Turbulent burning of methane-oxygen mixtures; by F. B. Shein and V. G. Shevchuk.

AD-644 034 — HC $3.00 MF $0.65

USE OF [illegible] METHOD TO SOLVE THE PROBLEM OF HEAT TRANSFER BETWEEN A GAS AND [illegible] BODY.

Foreign Technology Div., Wright-Patterson AFB, Ohio.

For primary bibliographic entry see Field 21E.

AD-644 052 — HC $3.00 MF $0.65

ZERO SOUND IN LIQUID 4He AND 3He.

Illinois Univ., Urbana.

For primary bibliographic entry see Field 20I.

AD-644 053 — Not available from CFSTI.

A NEW METHOD OF SOLVING PROBLEMS OF THERMAL CONDUCTIVITY FOR BODIES OF ROTATION.

Foreign Technology Div., Wright-Patterson AFB, Ohio.

V. I. Mukhovikov. 27 Sep 66. 10p FTD-HT-66-453

TT-67-60306

Unedited rough draft trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport n5 p151-54 1965.

Descriptors: (*Thermal conductivity, Bodies of revolution), USSR, Boundary value problems, Equations.

A method is proposed for solving problems of stationary thermal conductivity for a body of rotation that allows the use of the well studied examples of the solution of flat problems for harmonic functions when the boundary conditions on the surface of the body are satisfied. The axisymmetric problem is examined in detail. (Author)

AD-644 086 — HC $3.00 MF $0.65

TABLE OF THERMODYNAMIC PROPERTIES AND CHEMICAL COMPOSITION OF ARGON IN CHEMICAL EQUILIBRIUM INCLUDING SECOND VIRIAL CORRECTIONS FROM 2000 TO [illegible].

National Bureau of Standards, Washington, D. C.

For primary bibliographic entry see Field 7D.

AD-644 087 — HC $3.00 MF $0.65

THERMAL ACCOMMODATION COEFFICIENTS FROM HETEROGENEOUS VAPOR-SOLID NUCLEATION DATA.

Rumrille Memorial Inst., Columbian, Ohio.

For primary bibliographic entry see Field 7D.

AD-644 150 — Not available from CFSTI.

[illegible] CRYOGENIC CYROSCOPE PROGRAM AT JET PROPULSION LABORATORY [illegible] REPORT.

Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.

J. T. Harding. 1 Oct 66. 28p 9-654-CR-79872, (PL-TR-12-66)

Contract 9-653 (00)

Descriptors: *Cryogenic gyroscope, *Magnetic field, *Superconductivity, Cryogenics, Damping, Drift, Gyroscopes, Lead, Magnetic, Metal, Microscope, Problems, Rotor, Spheres, Spin, Viscosity.

For abstract, see [illegible] (AD-[illegible]).

[illegible] — HC $3.00 MF $0.65

[illegible] EFFECTS ON HEAT TRANSFER IN [illegible] FLOW [illegible] NO. 1, [illegible] 31, 1966.

Mississippi State Univ., State College. Dept. Of Mechanical Engineering.

C. J. Bell, G. D. Bridge, C. T. Carley, E. W. Fenton, and R. G. Forbes. 31 Aug 66. 74p 9-654-CR-79941 (PR-)

Contract 9-654 (00)

Descriptors: *Convection, *Transport property, *Vibration effect, Bibliography, Coil, Configuration, Cryogenics, Effect, Enclosure, Fluid, Geometry, Heat transfer, Natural, Property, Transport, Vibration.

For abstract, see STAR 05 02.
N67-11699 HC$3.00 MF$0.65

20N. WAVE PROPAGATION

DIFFRACTION OF A SCALAR WAVE BY A PLANE SCREEN.
New York Univ., N. Y. Courant Inst. of Mathematical Sciences.
Peter Wolfe. 12 Jul 65, 23p
Contract Nonr-285 (48)
Availability: Published in J. SIAM Appl. Math. v14 n3 p573-99 May 1966.

Descriptors: (*Diffraction, *Geometry), Electromagnetic waves, Partial differential equations, Series.

A new result in the geometrical theory of diffraction is presented. It is a method for obtaining a uniform representation of the diffracted field produced when a scalar wave is incident upon a plane screen with a curved edge. The representation is a series expansion associated with the diffracted rays, as in the usual geometrical theory of diffraction. However the first term in this representation is continuous at the edge and on the shadow boundaries. For a normally incident plane wave it is shown that all terms in the ray expansion can be computed and are continuous at the edge and on the shadow boundary. For a nonnormally incident plane wave and for a spherical wave only the first terms of the diffracted field are computed. The results are shown to agree with known results where both are applicable. The applicability of the method to other problems is discussed. (Author)
AD-643 681 Not available from CFSTI.

PROGRESSING WAVES RADIATED FROM A MOVING POINT SOURCE IN AN INHOMOGENEOUS MEDIUM.
New York Univ., N. Y. Courant Inst. of Mathematical Sciences.
Peter Wolfe, and Robert M. Lewis. 28 Jul 65, 24p
Contract Nonr-285 (48)
Prepared in cooperation with General Precision Aerospace, Little Falls, N. J.
Availability: Published in Journal of Differential Equation v2 n3 p328-50 Jul 1966.

Descriptors: (*Electromagnetic waves, Propagation), Approximation (Mathematics), Partial differential equations, Asymptotic series, Integral transforms.

The 'progressing wave formalism' provides a method for obtaining approximate solutions of suitable problems for the wave equation and other linear hyperbolic partial differential equations. This method is related to geometrical optics. It involves the construction of rays along which waves propagate. The object of this paper is to apply the method to a problem which can be solved by another procedure and to compare the results obtained by the two methods of solution. In this way the authors obtain a partial verification of the validity of the progressing wave formalism.
AD-643 684 Not available from CFSTI.

ON THE MEASUREMENT OF IONOSPHERIC DRIFTS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 4/5.
AD-643 628 HC $3.00 MF $0.65

A NEAR-FIELD SOLUTION FOR AN INFINITE LINE SOURCE ABOVE A DIELECTRIC COATED CONDUCTING PLANE.
Illinois Univ., Urbana. Antenna Lab.
For primary bibliographic entry see Field 20C.
AD-643 773 HC$3.00 MF$0.65

NAVIGATION WITH HIGH-ALTITUDE SATELLITES: A STUDY OF RANGING ERRORS.
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
For primary bibliographic entry see Field 17G.
AD-643 851 HC$3.00 MF$0.65

INTERFEROMETER SIGNAL STATISTICS UNDER GENERAL SCATTER CONDITIONS.
Boeing Scientific Research Labs., Seattle, Wash. Geo-Astrophysics Lab.
John M. Lansinger, and Edward J. Fremouw. Nov 66, 33p D1-82-0575
Prepared in cooperation with Alaska Univ., College. Geophysical Inst. Also available from the author.

Descriptors: (*Radio waves, Scattering), (*Statistical analysis, Radio signals), Interferometers, Extraterrestrial radio waves, Ionospheric propagation, Phase measurement, Numerical methods and procedures, Statistical distributions.

Analytical and numerical results describing the statistics of scattered signals observed interferometrically are presented. Observable quantities are given in terms of two wavefront parameters which are invariant in post-scattering propagation: the ratio of nonscattered to scattered flux and the wavefront autocorrelation. The analytical result refers to the average output of a phase-switch or coherently detecting phase-sweep interferometer. Numerical results are given for distributions and average characteristics of real amplitude-product and phase-difference, which are observable with phase-sweep interferometers employing other detection techniques. The treatment is based on the assumption of a randomly phased angular spectrum. However, no restrictions are placed on the degree of scatter or on the form of the autocorrelation function. (Author)
AD-643 930 HC$3.00 MF$0.65

PROBLEM OF DIFFRACTION ON A LATTICE FROM ARBITRARY PROFILES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
I. E. Tarapov. 12 Sep 66, 19p FTD-HT-66-170
Unedited rough draft trans. of Zhurnal Vychislitel'noi Matematiki i Matematicheskoi Fiziki (USSR) v7 n5 p883-93 1967.

Descriptors: (*Electromagnetic waves, Diffraction), (*Diffraction, *Integral equations), (*Rayleigh waves, Diffraction), Wave transmission, Approximation (Mathematics), Hydrodynamics, Electronics, USSR.
Identifiers: Lattices.

An examination was made of the use of integral equations in the problem of diffraction of flat waves on a lattice, formed by arbitrary profiles. Particular attention was given to a long wave approximation of the problem based on known Rayleigh ideas (1). In this case, in contrast from the ordinary investigation, the use of integral equations allows strict use of the method of subsequent approximations and offers a principal possibility of evaluation of the errors. (Author)
AD-644 082 HC $3.00 MF $0.65

HIGHER-ORDER DIFFRACTION CONCEPT APPLIED TO PARALLEL-PLATE WAVEGUIDE PATTERNS.
Ohio State Univ. Research Foundation, Columbus. Dept. Of Electrical Engineering.
R. C. Rudduck, and J. S. Yu. 15 Oct 65, 34p
NASA-CR-79408, REPT.-1691-16
Grant NSG-448

Descriptors: *Aperture, *Diffraction pattern, *Parallel plate, *Waveguide, Analysis, Application, Closed, Computation, Concept, Diffraction, Form, Higher order, Parallel, Pattern, Plate, Radiation, Structure.

For abstract, see STAR 05 02.
N67-12042 HC$3.00 MF$0.65

COMPENSATION OF THE EFFECTS OF THE SLOT IN A RECTANGULAR WAVEGUIDE.
North Carolina State Coll., Raleigh.
F. J. Tischer. Oct 66, 21p NASA-CR-80130, EML-RR-1
Contract NGR-34-002-047

Descriptors: *Rectangular guide, *Slot, *Wave propagation, Cross section, Field, Function, Guide, Impedance, Mapping, Mode, Propagation, Rectangle, Transformation, Wave, Waveguide.

For abstract, see STAR 05 02.
N67-12171 HC$3.00 MF$0.65

ON CERTAIN REGULARITIES IN THE FORMATION OF INHOMOGENEITIES IN THE IONOSPHERE AND THEIR RELATIONSHIP WITH PARTICLE RUN-OUT FROM OUTER SPACE.
O Nekotorykh Zakonomernostyakh V Obrazovanii Neodnorodnostey V Ionosfere
Consultants And Designers, Inc., Arlington, Va.
A. A. Bolshoy. 26 Aug 66, 10p NASA-CR-80168, ST-AI-RWP-10510
Contract NAS5-9299
Transl. Into English From Kosmich. Issled. (Moscow), V. 4, No. 4, 1966 P 568-573

Descriptors: *Cosmic radio wave, *Ionospheric irregularity, *Wave diffraction, Cause, Cosmic, Density, Diffraction, F layer, Ionospheric, Irregularity, Measurement, Particle, Radio, Reflection, Satellite, Scintillation, Signal, Space, Wave.

For abstract, see STAR 05 02.
N67-12243 HC$3.00 MF$0.65

21. PROPULSION AND FUELS

21B. COMBUSTION AND IGNITION

HOT GAS IGNITION TEMPERATURES OF HYDROCARBON FUEL VAPOR-AIR MIXTURES.
Report of investigations,
Bureau of Mines, Washington, D. C.
J. M. Kuchta, and R. J. Cato. 1966, 18p RI-6857

Descriptors: (*Jet engine fuels, Ignition), (*Airplane engine oils, Ignition), (*Ignition, Fuels), Temperature, Hydrocarbons, Vapors, Air, Mixtures, Jets, Determination.

Laminar hot air jets of 1/8- to 3/4-inch diameter were used to determine the hot gas ignition temperatures of various combustible vapor-air mixtures. The combustibles were n-hexane, n-octane, n-decane, a hydrocarbon jet fuel (JP-6), and an ashless ester aircraft engine oil (MIL-L-7808). Minimum ignition temperatures occurred at a fuel to air weight ratio of about 0.5 and were not greatly sensitive to variations of fuel concentration. Moderate variations of jet velocity also had little influence on these ignition temperatures. However, these temperatures decreased with increase in heat source dimensions (jet diameter). The hot gas ignition temperatures of the combustibles were not necessarily much greater than corresponding autoignition and wire ignition temperatures when the size of the heat source and the ignition criterion were the same. (Author)
AD-643 518 HC$3.00 MF$0.65

PROPULSION TECHNOLOGY: MONTHLY SURVEY NO. 1.
ATD work assignment nos. 68, 76, 88.

Library of Congress, Washington, D. C. Aerospace Technology Div.
Oct 66, 55p ATD-66-121
TT-67-60179
Based on current open sources of the Eurasian Communist Countries.

Descriptors: (*Propulsion, Reviews), (*Rocket propulsion, Reviews), (*Combustion, Reviews), Jet engines, Gas flow, Engines + motors, Rocket motors, Rocket propellants, Abstracts.

A review of the literature was made on airbreathing propulsion, rocket propulsion, and combustion engineering.
AD-643 526 HC$3.00 MF$0.65

[illegible]
Technical note.
Toronto Univ. (Ontario). Inst. for Aerospace Studies.
Aeron. Report No. 66, 31p UTIAS-TN-102
Contract AF 33(615)-2768
See also AD-613 [illegible].

Descriptors: (*Thermodynamics, *Combustion), (*Hydrogen, Combustion), (*Oxygen, Combustion), Specific heat, Helium, Mixtures, Velocity, Sound, Temperature, Pressure, Tables, Graphics.

This note is complementary to UTIAS Technical Note No. 85, 'Thermodynamic and Composition Data for Constant-Volume Combustion of Stoichiometric Mixtures of Hydrogen-Oxygen Diluted with Helium or Hydrogen', by A. Benoit (AD-623 942). It includes the calculation of the equilibrium specific heats, the equilibrium specific heat ratios, the isentropic exponents, and the corresponding values of the speeds of sound. For convenience, the final-to-initial temperature ratio and the final-to-initial pressure ratio have also been included in the present tables. The results are presented for helium- and hydrogen dilution respectively. (Author)
AD-643 670 HC$3.00 MF$0.65

DETERMINATION OF IGNITION CONDITIONS.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. M. Gridnin, and O. M. Todes. 29 Aug 66, 17p
FTD-MT-66-470,
TT-67-60050
Untitled rough draft trans. of [illegible]

Descriptors: (*Ignition, Equations), (*Explosions, Equations), Differential equations, Thermodynamics, Boundary value problems, Ethers.

A simple method for determining ignition conditions based on integration of initial nonlinear equations is presented. Good agreement between precise ignition conditions and approximations obtained by means of the linearization method is demonstrated by examples. A physical interpretation of the linearization method is given. (Author)
AD-645 [illegible] HC$3.00 MF$0.65

[illegible]
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 21[illegible]
AD-644 [illegible] HC$3.00 MF$0.65

[illegible]
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20M.
AD-644 034 HC$3.00 MF$0.65

A. S. Sokolik, and E. S. Semenov. 30 Jun 66, 23p FTD-MT-65-550
TT-67-60296
Edited machine trans. of mono. Issledovanie Plazmy v Laminarnykh i Turbulentnykh Plamenakh Uglevodorodov, Moscow 1965 17p.

Descriptors: (*Flames, *Plasma physics), (*Hydrocarbons, Flames), Gas ionization, Recombination reactions, Diffusion, Laminar flow, Turbulence, Flame propagation, Ignition, Detonation waves, Propanes, Methane, Combustion, USSR.

The ionization of hydrocarbon-air flames was studied under conditions of moving spherical flames in a closed vessel (bomb) by means of a one-electrode probe and an oscilloscope. The ion-generating reactions CH + O to CHO + e + [illegible] hydrocarbon flames occurs due to transfer of CH[illegible] radicals and O or H atoms in the reaction zone, followed by reaction H + O2 to OH + H. The part played by diffusion within the reaction zone obtains confirmation in measurements of ionization in turbulent flames, in the fact that velocity pulses are followed by pulses of ionization currents, and also in that the maximum ionization current amplitudes in turbulent flames increase with the turbulence intensity, and are considerably higher than those for laminar flames in the same mixtures. Analysis of data on ionization in a detonation wave of hydrocarbon-oxygen flames results in two alternative concepts of the mechanism of ignition in a detonation wave. (Author)
AD-644 008 HC$3.00 MF$0.65

JOURNAL OF ENGINEERING PHYSICS (SELECTED ARTICLES).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20M.
AD-644 034 HC$3.00 MF$0.65

PERCHLORIC ACID FLAMES: PART VI. ETHANE-RICH FLAMES.
Technical rept.,
Rocket Propulsion Establishment, Wescott (England).
G. S. Pearson. Mar 66, 27p RPE-TR-66/2

Descriptors: (*Oxidizers, Perchloric acid), (*Perchloric acid, *Flames), (*Alkanes, Combustion), Flame propagation, Temperature, Burning rate, Combustion products, Heat of activation, Flammability, Carbon, Combustion deposits, Gross division.
Identifiers: Ethanes.

Burning velocities, temperatures and burnt gas compositions were measured for ethane-perchloric acid premixed flames containing from 1 to 17 mass % water which is required for a complete combustion. Soot formation was observed for rich mixtures with a limited range of mixture ratios. When the amount of ethane exceeds three to four moles per mole of acid, the excess ethane does not react but functions as a diluent. The observed products are discussed and a mechanism is proposed that is broadly similar to that suggested previously for methane-rich flames. The general properties of fuel-rich perchloric acid flames are discussed. (Author)
AD-644 [illegible] HC$3.00 MF$0.65

[illegible]
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 21[illegible]
AD-644 [illegible] HC$3.00 MF$0.65

[illegible]
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 21[illegible]
AD-644 [illegible] HC$3.00 MF$0.65

ty, Oscillation, Particle, Powder, Pressure, Propellant, Solid, Vortex.

For abstract, see STAR 05 02.
N67-11335 HC$3.00 MF$0.65

FLAME SPREADING OVER THE SURFACE OF DOUBLE BASE PROPELLANTS AT HIGH PRESSURE ANNUAL REPORT.
Stevens Inst. Of Tech., Hoboken, N. J. Dept. Of Mechanical Engineering.
R. S. Magee, R. F. Mc Alevy, III, and J. A. Wrubel. Oct 66, 62p NASA-CR-79542, ME-RT-66010
Grant NsG(T)-77/51, Contract NGR-31-003-016

Descriptors: *Double base propellant, *Environment, *Flame, Burn, Chemical, Correlation, Data, High pressure, Ignition, Linear, Nitrogen, Oxygen, Rate, Reactivity, Spread, Surface, Velocity.

For abstract, see STAR 05 02.
N67-11710 HC$3.00 MF$0.65

A PRELIMINARY INVESTIGATION OF GELLED-RED FUMING NITRIC ACID/UNSYMMETRICAL DIMETHYLHYDRAZINE COMBUSTION CHARACTERISTICS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
C. R. Bailey. Dec 66, 38p NASA-TN-D-3729

Descriptors: *Hydrogen fuel, *Ignition, *Liquid oxygen fuel, *Propellant combustion, Characteristics, Combustion, Firing, Fuel, Hydrogen, Liquid, Low, Mixture, Operation, Oxidizer, Oxygen, Performance, Propellant, Ratio, Test.

For abstract, see STAR 05 02.
N67-11812 HC$3.00 MF$0.65

DEVELOPMENT OF DETONATION IN LIQUID FUEL SPRAY WITH GASEOUS OXIDIZER PRELIMINARY EXPERIMENTS.
California Univ., Berkeley. Office Of Research Services.
D. H. Morris, A. K. Oppenheim, and S. Wojcicki.
Oct 66, 48p NASA-CR-80098, AS-66-15
Grant NSG-702

Descriptors: *Detonation, *Fuel spray, *Oxidizer, Flame, Fuel, Gaseous, Kerosene, Kinetics, Liquid, Oxygen, Photograph, Plexiglas, Pressure, Reaction, Spray, Tube.

For abstract, see STAR 05 02.
N67-12158 HC$3.00 MF$0.65

21D. FUELS

[illegible]
Bureau of Mines, Washington, D. C.
For primary bibliographic entry see Field 21B.
AD-643 [illegible] HC$3.00 MF$0.65

[illegible]
Foreign Technology Div., Wright-Patterson AFB, Ohio.
[illegible]

Descriptors: [illegible]

fuels; Chemical composition of jet fuels; Change in quality of jet fuels during storage; Pumpability of jet fuels; Thermooxidizing stability and anti-wear properties of jet fuels; Evaporation and combustion of jet fuels.
AD-644 109 HC$3.00 MF$0.65

21E. JET AND GAS TURBINE ENGINES

PROPULSION TECHNOLOGY: MONTHLY SURVEY NO. 1.
Library of Congress, Washington, D. C. Aerospace Technology Div.
For primary bibliographic entry see Field 21B.
AD-643 526 HC$3.00 MF$0.65

USE OF FINITE DIFFERENCE METHOD TO SOLVE THE PROBLEM OF HEAT TRANSFER BETWEEN A GAS AND TURBINE BLADE.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. M. Tarasov, and Yu. N. Kulesh. 2 Sep 66, 16p FTD-MT-66-487
TT-67-60292
Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii, Aviatsionnaya Tekhnika (USSR), n3 p119-26 1965.

Descriptors: (*Gas turbine blades, Heat transfer), Gases, USSR, Difference equations, Turbine blades.

Four systems of finite difference equations of varying complexity are used for determining the measurement of the temperature of the uncooled blades along the apex. Computations are accomplished indicating the magnitude of the summary error with varying quantities of sections and utilizing various systems of finite difference equations. The possibility of applying investigated assumptions in the construction of finite difference equations for the determination of temperatures of turbine blades, along the apex undergoing cooling, is shown. An example is given of the computation of the temperature of a blade undergoing air cooling. (Author)
AD-644 032 HC$3.00 MF$0.65

21F. NUCLEAR PROPULSION

NUCLEAR RESEARCH SHIP " OTTO HAHN" ANNUAL REPORT, FOR 1965.
Gesellschaft Fur Kernenergieverwertung, Hamburg (West Germany).
For primary bibliographic entry see Field 18E.
For abstract, see STAR 05 02.
N67-11958 HC$3.00 MF$0.65

21G. RECIPROCATING ENGINES

EVALUATION OF MUFFLER MATERIAL SAMPLES.
Final technical rept., Feb-Aug 66.
Army Engineer Research and Development Labs., Fort Belvoir, Va.
Darin A. Geneto, Oct 66, 15p AERDL-1974

Descriptors: (*Engine mufflers, Materials), (*Internal combustion engines, Engine mufflers, Specifications, Corrosion resistance, Coatings, Engine exhausts, Deterioration, Military requirements).

A practical field corrosion test, with respect to time, was designed to evaluate the corrosion resistance of various coated and uncoated muffler materials. Basically, the test is a modification of the Chrysler test used by industry. The duration of the test was shortened from 150 hours to 8 hours. Other variables, such as the salt fog spray test and the addition of hydrochloric acid to the corrosive medium, were evaluated. Stronger or weaker corrosive mediums than the one suggested by Materials Research Laboratory were found impractical. The results obtained were in close agreement with the available data received from the Chrysler test and field performance.
AD-643 771 HC$3.00 MF$0.65

21H. ROCKET MOTORS AND ENGINES

A PROPOSED CORRELATION SCHEME FOR GAS-FILM COOLING DATA.
Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 20M.
AD-643 523 HC$3.00 MF$0.65

LIQUID-FUEL ROCKET ENGINES (CHAPTER XIX).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
V. A. Tyutyunov, and S. I. Lovinskii. 13 Sep 66, 21p FTD-MT-66-41
Edited machine trans. of mono. Aviatsionnye Dvigateli, Moscow, 1964 p310-327.

Descriptors: (*Rocket motors (Liquid propellant), Rocket heads), (*Liquid rocket fuels, Engines + motors), Combustion chambers, Combustion chamber gases, Kinetic energy, Rocket motor nozzles, Rocket igniters, Fuel tanks.

Basic structural elements of liquid-fuel rocket engines are: (1) combustion chamber, consisting of head, combustion chamber itself, and nozzle. In combustion chamber occurs burning of fuel and conversion of heat to kinetic energy of stream of gases, as a result of which jet thrust is created. In chamber complicated thermodynamic processes take place, and there are colossal heat flows; (2) fuelfeed system, consisting of fuel tanks, device for forced supply of components of fuel to chamber, lines, and fittings; (3) ignition system, intended to ignite fuel for starting. Engines using spontaneously inflammable fuel have no ignition system.
AD-644 000 HC$3.00 MF$0.65

THE EFFECT OF SEVERAL INJECTOR FACE BAFFLE CONFIGURATIONS ON SCREECH IN A 20,000-POUND THRUST HYDROGEN-OXYGEN ROCKET.
National Aeronautics And Space Administration, Lewis Research Center, Cleveland, Ohio.
W. P. Hueman, and H. E. Scott. 1966, 11p NASA-TM-X-52251
Presented At The 3rd Combust. Conf., Kennedy Space Center, Fla., 17-21 Oct. 1966, Sponsored By The Interagency Chem. Rocket Propulsion Group

Descriptors: *Acoustics, *Baffle, *Injector, *Liquid-hydrogen engine, Combustion, Conference, Design, Engine, Hydrogen, Liquid, Lox, Rocket engine, Stability, Testing.

For abstract, see STAR 05 02.
N67-11336 HC$3.00 MF$0.65

EXPERIMENTAL INVESTIGATION OF ACOUSTIC LINERS TO SUPPRESS SCREECH IN HYDROGEN-OXYGEN ENGINES.
National Aeronautics And Space Administration, Lewis Research Center, Cleveland, Ohio.
H. E. Bloomer, D. W. Vincent, and J. P. Washington. 1966, 11p NASA-TM-X-52251
Presented At The 3rd Combust. Conf., Kennedy Space Center, Fla., 17-21 Oct. 1966, Sponsored By The Interagency Chem. Rocket Propulsion Group

Descriptors: *Acoustic impedance, *Lox-hydrogen engine, Absorption, Acoustic, Chemical, Coefficient, Combustion, Conference, Dynamics, Engine, Hydrogen, Impedance, Injection, Instability, Liner, Lox, Propulsion, Rocket.

For abstract, see STAR 05 02.
N67-11336 HC$3.00 MF$0.65

A SURVEY OF STRUCTURAL DYNAMICS OF SOLID PROPELLANT ROCKET MOTORS.
Catholic Univ. Of America, Washington, D. C.
J. H. Baltrukonis. Dec 66, 53p NASA-CR-658
Grant NSG-125

Descriptors: *Solid propellant rocket engine, *Structural dynamics, Corrosion, Deformation, Development, Dynamics, Engine, Grain, Mechanics, Motor, Prevention, Propellant, Rocket, Solid, Structural, Survey.

For abstract, see STAR 05 02.
N67-11953 HC$3.00 MF$0.65

21I. ROCKET PROPELLANTS

AXIAL SHEAR VIBRATIONS OF A CYLINDER OF DECREASING THICKNESS.
Northwestern Univ., Evanston, Ill.
For primary bibliographic entry see Field 20K.
AD-643 577 Not available from CFSTI.

LIQUID-FUEL ROCKET ENGINES (CHAPTER XIX).
Foreign Technology Div., Wright-Patterson AFB, Ohio.
For primary bibliographic entry see Field 21H.
AD-644 000 HC$3.00 MF$0.65

SYNTHESIS OF OF2 BY ELECTROLYSIS OF WET HF.
American Oil Co., Whiting, Ind. Research and Development Dept.
For primary bibliographic entry see Field 7B.
AD-644 083 Not available from CFSTI.

22. SPACE TECHNOLOGY

22A. ASTRONAUTICS

HEAT OPTIMUM ACCELERATION IN CENTRAL FIELD.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
G. B. Efimov, and D. E. Okhotsimskii. 31 Aug 66, 30p FTD-MT-65-588
Edited machine trans. of Ob Optimul'nom Razgone v Tsentral'nom Pole.

Descriptors: (*Spacecraft, Acceleration), Circular orbit trajectories, Optimization, Thrust, Analysis of variance, USSR.

Consideration is given to a variational problem about optimum acceleration of spacecraft with low thrust, starting from an orbit close to circular and attaining hyperbolic velocity. Regularities of optimum motion were investigated. A comparison was made with motion under action of constant tangential acceleration. Considerations are given pertaining to construction of a limiting solution of variational problem, calculation of which would allow one to reduce estimation of basic parameters of optimum acceleration to the use of a table with one entry or to calculation by means of the final formulas. (Author)
AD-643 955 HC$3.00 MF$0.65

CURRENT TRENDS IN AEROSPACE COMPUTATION AND SOME IMPLICATIONS.
G.A.M.D. Corp., Santa Monica, Calif.
For primary bibliographic entry see Field 9B.
AD-643 864 HC$3.00 MF$0.65

AN ACTIVE AND/OR PASSIVE SPACECRAFT ATTITUDE CONTROL.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. R. Mc Carthy. May 66, 32p NASA-TM-X-55575, X-723-66-216

Descriptors: *Gyroscopes, *Satellite attitude control, *Solar sail, Activity, Attitude, Cell, Control, Earth, Orbit, Oscillation, Paddle, Passive, Sail, Satellites, Sensor, Solar, Spacecraft, Stabilization, Torque.

For abstract, see STAR 05 02.
N67-11107 HC$3.00 MF$0.65

A DETERMINATION OF THE MAGNITUDE AND BRIGHTNESS FLUCTUATIONS OF THE FAUROBATELLITE.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
D. O. Cowan, and J. C. Mayo. Jul 66, 38p NASA-TM-X-55505, X-524-66-337

Descriptors: *Brightness, *Papers, *Satellite observation, Curve, Fluctuation, Intensity, Light, Magnitude, Observation, Optics, Power, Satellite, Spectrum, Tracking.

For abstract, see STAR 05 02.
N67-11372 HC$3.00 MF$0.65

DETERMINATION OF THE GRAVITATIONAL FIELD OF THE MOON BY THE MOTION OF THE AMS LUNA-10.
Opredeleniye Polya Tyagoteniya Luny Po Dvizheniye Isl "luna-10"
Volt Technical Corp., Washington, D. C.
E. L. Akim. 1 Nov 66, 7p NASA-CR-79543, ST-CM-LPS-10532
Contract NAS5-12487
Transl. Into English From Dokl. Akad. Nauk Sssr (Moscow), V. 170, No. 4, 1966 P 799-802

Descriptors: *Lunar gravitational effect, *Planetary gravitation, *Satellite orbit, *U.S.S.R., Earth, Effect, Field, Gravitational, Gravity, Lunar, Measurement, Orbit, Perturbation, Planetary, Probe, Satellite, Sun, Trajectory.

For abstract, see STAR 05 02.
N67-11733 HC$3.00 MF$0.65

A FULL-SIZE PILOT-CONTROLLED DOCKING SIMULATION OF THE APOLLO COMMAND AND SERVICE MODULE WITH THE LUNAR MODULE.
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
N. R. Driscoll, H. G. Hatch, Jr., and J. E. Pennington. Dec 66, 37p NASA-TN-D-3688
Contract 125-19-01-0600-23

Descriptors: *Apollo spacecraft, *Command module, *Docking, *Flight simulation, *Service module, Command, Comparison, Control, Equation, Flight, Information, Lunar, Method, Module, Motion, Pilot, Rating, Service, Simulation, Spacecraft, Visual.

For abstract, see STAR 05 02.
N67-11809 HC$3.00 MF$0.65

ATTITUDE STABILITY OF A SPINNING PASSIVE SATELLITE IN A CIRCULAR ORBIT SEMIANNUAL TECHNICAL PROGRESS REPORT, 1 JUN. - 30 NOV. 1966.
Arizona State Univ., Tempe. Coll. Of Engineering Sciences.
[illegible]. Nov 66, 54p NASA-CR-70267
Contract NGR-03-001-014

Descriptors: *Attitude, *Circular orbit, *Passive satellite, *Stability, Body, Circular, Gradient, Gravity, Orbit, Passive, Rigid, Rotation, Satellite, Spin, Stabilization.

For abstract, see STAR 05 02.
N67-11961 HC$3.00 MF$0.65

ADVANCED PLANETARY PROBE STUDY, VOLUME I - STUDY APPROACH FINAL TECHNICAL REPORT.
Tow Systems, Redondo Beach, Calif.
27 Jul 66, 96p NASA-CR-79500, TRW-4547-6004-R000
Contracts NAS7-100, JPL-951311
Prepared For Jpl

Descriptors: *Flyby mission, *Jupiter project, *Planetary spacecraft, *Spacecraft design, Approach, Attitude, Control, Design, Experiment, Flyby, Instrumentation, Mission, Payload, Planetary, Requirement, Science, Spacecraft, Spin, Stabilization, Statement, Study, Work.

For abstract, see STAR 05 02.
N67-12064 HC$3.00 MF$0.65

THE DYNAMICS OF A SPINNING SOLAR-POWERED, STABILIZED SATELLITE WITH FREE FLUID DAMPING.
Massachusetts Inst. Of Tech., Cambridge. Center For Space Research.
J. V. Harrington. Jun 66, 21p NASA-CR-80082, CSR-TR-66-6
Contract NASR-249

Descriptors: *Radiation pressure, *Satellite orbit, *Spin stabilization, Control, Damping, Dynamics, Equation, Heliocentric orbit, Heliocentricity, Motion, Orbit, Precession, Pressure, Radiation, Satellite, Solar, Spin, Stabilization.

For abstract, see STAR 05 02.
N67-12064 HC$3.00 MF$0.65

STRATIFIED AND FACETED SHAPES ON PANORAMAS OBTAINED FROM THE STATION LUNA-9.
Volt Technical Corp., Washington, D. C.
V. M. Vakhnin, and G. I. Zmiyevskaya. 24 Oct 66, 4p NASA-CR-80094, ST-LPS-10527
Contract NAS5-12487
Transl. Into English From Dokl. Akad. Nauk Sssr, Geofiz. (Moscow), V. 170, No. 3, 1966 P 160

Descriptors: *Lunar photograph, *Photograph interpretation, Composition, Facet, Interpretation, Lunar, Mineral, Photograph, Shape, Stratification, Structure, Surface.

For abstract, see STAR 05 02.
N67-12154 HC$3.00 MF$0.65

AN INDICATED SPECULAR DEGRADATION RATE FOR ALUMINIZED MYLAR SURFACES IN NEAR-EARTH ORBIT FROM RECENT PHOTOMETRIC OBSERVATIONS OF THE ECHO I SATELLITE.
Goodyear Aerospace Corp., Akron, Ohio.
R. H. Emmons. 17 Jun 64, 16p NASA-CR-80175, GER-11521, REV. A
Contract NAS1-3114
Presented At The 116th Meeting Of The Am. Astron. Soc., Flagstaff, Ariz., 24-27 Jun. 1964

Descriptors: *Echo i satellite, *Mylar, *Specular reflection, Aluminization, Degradation, Illumination, Life, Measurement, Optics, Orbit, Photometry, Reflection, Satellite, Specular, Surface, Thermal.

For abstract, see STAR 05 02.
N67-12307 HC$3.00 MF$0.65

LOW-THRUST TRAJECTORY CAPABILITIES FOR EXPLORATION OF THE SOLAR SYSTEM USING NUCLEAR ELECTRIC PROPULSION.
It Research Inst., Chicago, Ill. Astro Sciences Center.
A. L. Friedlander. Oct 66, 62p NASA-CR-79297, T-17
Contract NASR-6506/

Descriptors: *Low thrust propulsion, *Nuclear-electric propulsion, *Planetary exploration, *Trajectory analysis, Analysis, Capture, Design, Electric, Exploration, Flight, Flyby, Low thrust, Mercury (planet), Mission, Nuclear, Payload, Planetary, Plant, Pluto (planet), Power, Propulsion, Solar, System, Time, Trajectory, Unmanned.

For abstract, see STAR 05 02.
N67-12224 HC$3.00 MF$0.65

SCIENTIFIC RESULTS OF PROCESSING OF PANORAMAS OBTAINED FROM PHOTOGRAPHS OF THE LUNAR SURFACE TAKEN FROM "LUNA-9".
Consultants And Designers, Inc., Arlington, Va.
A. F. Lebedinskiy. 29 May 66, 11p NASA-CR-80171, ST-LPS-10493
Contract NAS5-9280
Transl. Into English From Reprint Of The Usaf Acad. Of Sci., 1966

Descriptors: *Lunar photograph, *Lunar surface, Camera, Crater, Formation, Ground, Horizon, Lunar, Panorama, Photograph, Probe, Processing, Structure, Surface, Television.

For abstract, see STAR 05 02.
N67-12239 HC$3.00 MF$0.65

THE FUTURE OF SPACE TRAVEL.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
W. Von Braum. 13 Oct 66, 15p NASA-TM-X-59138

Descriptors: *Space exploration, *Weather forecasting, Agriculture, Apollo project, Cartography, Communication, Conference, Exploration, Flyby, Forecasting, Geography, Hydrology, Landing, Launch vehicle, Lunar, Meteorology, Oceanography, Remote, Satellite, Sensor, Space, Speech, Weather.

For abstract, see STAR 05 02.
N67-12246 HC$3.00 MF$0.65

22B. SPACECRAFT

AERO-ACOUSTIC EXCITATION OF STRUCTURES,
David Taylor Model Basin, Washington, D. C. Acoustics and Vibration Lab.
For primary bibliographic entry see Field 20K.
AD-643 696 HC$3.00 MF$0.65

DESIGNING A REGENERATIVE CO2 REMOVAL SYSTEM FOR MANNED SPACECRAFT,
Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
Richard D. Stolk. 1966, 6p
Availability: Published in Chemical Engineering 6p Oct 24 1966.

Descriptors: (*Carbon dioxide, *Adsorption), (*Closed ecological systems, Air), Manned spacecraft, Desiccants, Purification.

The article discusses equipment design, process parameters, desiccants and CO2 adsorbents.
AD-643 796 Not available from CFSTI.

THE CONSTRUCTION, CALIBRATION AND OPERATION OF THE UNIVERSITY OF MINNESOTA EXPERIMENTS FOR OGO-I AND OGO-III.
Technical rept.,
Minnesota Univ., Minneapolis. Cosmic Ray Group.
S. R. Kane, K. A. Pfitzer, and J. R. Winckler. Sep 66, 49p CR-87

Descriptors: (*Satellites (Artificial), Ionization chambers), (*Ionization chambers, Calibration), Radiation measurement systems, Spacecraft, Spectrum analyzers, Magnetosphere, Solar flares, Electrons, X rays, Protons, Cosmic rays.
Identifiers: Ogo.

The report presents our final and best estimates of the response characteristics of the ionization chamber and electron spectrometer experiments flown on the OGO-I and OGO-III satellites. It should be recognized that the ionization chamber is a blind detector and, although remarkably sensitive and stable, cannot inherently distinguish different types of radiation. However, in many cases, the type of radiation can be identified by its time characteristics or by correlated measurements available from other satellite detectors or from ground based observations. The electron spectrometer is designed to give definitive measurements of the electron fluxes in the inner and outer zone and has performed well.
AD-643 865 HC$3.00 MF$0.65

MECHANICAL DESIGN OF SPACECRAFT.
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
1 Aug 62, 86p NASA-CR-79531
Contract NAS7-100
Seminar Proc. Held 28 Mar.- 23 May 1962

Descriptors: *Engineering development, *Mariner space probe, *Spacecraft instrumentation, *Spacecraft structure, *Structural material, Control, Design, Development, Engineering, Fabrication, Instrumentation, Integration, Interplanetary, Material, Mechanics, Probe, Problem, Science, Space, Spacecraft, Structure, Temperature, Travel.

For abstract, see STAR 05 02.
N67-11281 HC$3.00 MF$0.65

SURVEY OF OPERATION AND COST EXPERIENCE OF THE X-15 AIRPLANE AS A REUSABLE SPACE VEHICLE.
National Aeronautics And Space Administration. Flight Research Center, Edwards, Calif.
J. E. Love, and W. R. Young. Nov 66, 12p NASA-TN-D-3732
Contract 719-04-00-06-24

Descriptors: *Cost estimate, *Reusable spacecraft, *X- 15 aircraft, Cost, Estimate, Ground, Manpower, Operation, Reuse, Spacecraft, Support, Survey.

For abstract, see STAR 05 02.
N67-11328 HC$3.00 MF$0.65

FEASIBILITY STUDY OF AN AERONOMY SATELLITE FINAL REPORT.
Space Craft, Inc., Huntsville, Ala.
5 Aug 66, 230p NASA-CR-79700
Contract NAS5-9346

Descriptors: *Aeronomy, *Propulsion system, *Satellite design, Attitude, Control, Cost, Design, Estimate, Feasibility, Launch, Mission, Orbit, Performance, Plan, Propulsion, Satellite, System.

For abstract, see STAR 05 02.
N67-11340 HC$3.00 MF$0.65

THE EFFECTIVENESS OF SYSTEMS TESTS IN ATTAINING RELIABLE EARTH SATELLITE PERFORMANCE.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A. R. Timmins. Nov 66, 11p NASA-TN-D-3713
Contract 124-12-03-01-51
Presented At The Inst. Of Environ. Sci., San Diego, Calif., Apr. 1966

Descriptors: *Satellite, *Space simulation, *Spacecraft reliability, *Test method, Control, Design, Earth, Flight, Level, Method, Model, Performance, Quality, Reliability, Simulation, Space, Spacecraft, System, Test, Thermal, Time.

For abstract, see STAR 05 02.
N67-11347 HC$3.00 MF$0.65

HISTORY OF ORBITING SOLAR OBSERVATORY OSO-I.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Apr 66, 121p NASA-TM-X-55190, X-440-66-122

Descriptors: *Electromagnetic radiation, *Oso-i, *Solar activity, Activity, Development, Electromagnetic, Experiment, Gamma, History, Launch, Operation, Orbit, Oso-b, Radiation, Ray, Solar, Spectrum, Terminal, Tracking, X-ray.

For abstract, see STAR 05 02.
N67-11368 HC$3.00 MF$0.65

THE METEOROID SATELLITE PROJECT PEGASUS FIRST SUMMARY REPORT.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
W. G. Johnson. Nov 66, 116p NASA-TN-D-3505

Descriptors: *Data retrieval, *Meteoroid hazard, *Pegasus satellite, *Satellite instrumentation, Aluminum, Control, Data, Design, Detector, Flux, Hazard, Instrumentation, Measurement, Meteoroid, Operation, Panel, Penetration, Retrieval, Satellite, Saturn launch vehicle, Structural, Thermal.

For abstract, see STAR 05 02.
N67-11381 HC$3.00 MF$0.65

OSO SPACECRAFT MANUAL.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Jul 66, 149p NASA-TM-X-55616, X-440-66-346

Descriptors: *Manual, *Oso, Antenna, Balance, Command, Launch, Magnetic, Monitor, Power, Sail, Structural, Structure, System, Telemetry, Temperature, Wheel.

For abstract, see STAR 05 02.
N67-11395 HC$3.00 MF$0.65

CRYOGENIC STORAGE SYSTEM STUDY PROGRAM (AES PAYLOADS) TECHNICAL FINAL REPORT, FEB. 1 - AUG. 1, 1966.
Boeing Co., Seattle, Wash. Aerospace Group.
2 Nov 66, 296p NASA-CR-61154
Contract NAS8-20272
Flight Center, 2 Nov. 1966 296 P Refs

Descriptors: *Cryogenic propellant, *Liquid propellant, *Lunar program, *Propellant storage, Cryogenic, Cylinder, Design, Hydrogen, Launch, Liquid, Lox, Lunar, Oxygen, Program, Propellant, Protection, Spherical, Storage, Tank, Thermal, Weight.

For abstract, see STAR 05 02.
N67-11397 HC$3.00 MF$0.65

CRYOGENIC STORAGE SYSTEM STUDY PROGRAM (AES PAYLOADS) SUMMARY TECHNICAL REPORT, FEB. 1 - AUG. 1, 1966.
Boeing Co., Seattle, Wash. Aerospace Group.
2 Nov 66, 56p NASA-CR-61155
Contract NAS8-20272
Flight Center, 2 Nov. 1966 56 P

Descriptors: *Cryogenic propellant, *Liquid propellant, *Lunar program, *Propellant storage, Cryogenic, Design, Fuel, Hydrogen, Liquid, Lunar, Oxygen, Payload, Program, Propellant, Protection, Storage, System, Tank, Test, Thermal, Weight.

For abstract, see STAR 05 02.
N67-11398 HC$3.00 MF$0.65

STUDY OF EXPANDABLE, TERMINAL DECELERATORS FOR MARS ATMOSPHERE ENTRY, VOLUME I FINAL SUMMARY REPORT, DEC. 1965 - OCT. 1966.
Goodyear Aerospace Corp., Akron, Ohio. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
J. L. Musil. 21 Oct 66, 130p NASA-CR-79526, GER-12842, VOL. I, REV.A
Contracts NAS7-100, JPL-951153
Prepared For Jpl

Descriptors: *Decelerator, *Expandable structure, *Mars spacecraft, Atmosphere, Capsule, Design, Entry, Environment, Landing, Mars, Model, Retardation, Spacecraft, Stability, Structure, Terminal.

For abstract, see STAR 05 02.
N67-11721 HC$3.00 MF$0.65

LUNA-10 TRANSMITS PHOTOGRAPHS.
"luna-12" Peredayet Snimki
Volt Technical Corp., Washington, D. C.
3 Nov 66, 6p NASA-CR-79544, ST-PR-LPS-10534
Contract NAS5-12487
Transl. Into English From Pravda (Moscow), 30 Oct. 1966 6 P

Descriptors: *Lunar probe, *Space photography, *U.S.S.R., Crater, Density, Lunar, Mare, Orbit, Photography, Probe, Roughness, Space, Surface, Trajectory, Transmission.

For abstract, see STAR 05 02.
N67-11734 HC$3.00 MF$0.65

THERMAL DESIGN EVALUATION OF PEGASUS.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
R. Linton. Dec 66, 53p NASA-TN-D-3642

Descriptors: *Pegasus satellite, *Spacecraft design, *Thermal effect, Adapter, Design, Detector, Eccentricity, Effect, Evaluation, Louver, Meteoroid, Module, Orbit, Panel, Satellite, Service, Spacecraft, System, Thermal.

For abstract, see STAR 05 02.
N67-11956 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS ON ARTIFICIAL EARTH SATELLITES, NO. 70.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
1964, 65p
In Russian

Descriptors: *Geocentric coordinate, *Satellite observation, *U.S.S.R. space program, Coordinate, Cosmos ii satellite, Cosmos viii satellite,

Cosmos xi satellite, Cosmos xvii satellite, Cosmos satellite, Equator, Geocentric, Horizontal, Observation, Satellite, Sputnik satellite.

For abstract, see STAR 05 02.
N67-11990 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS ON ARTIFICIAL EARTH SATELLITES, NO. 72.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
1964, 47p
In Russian

Descriptors: *Geocentric coordinate, *Satellite observation, *U.S.S.R. space program, Coordinate, Cosmos ii satellite, Cosmos viii satellite, Cosmos xvii satellite, Cosmos satellite, Equator, Geocentric, Horizontal, Observation, Satellite, Sputnik satellite, Vostok v spacecraft.

For abstract, see STAR 05 02.
N67-11992 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS ON ARTIFICIAL EARTH SATELLITES, NO. 73.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
1964, 47p
In Russian

Descriptors: *Geocentric coordinate, *Satellite observation, *U.S.S.R. space program, Coordinate, Cosmos ii satellite, Cosmos xvii satellite, Cosmos satellite, Equator, Geocentric, Horizontal, Observation, Satellite, Sputnik satellite.

For abstract, see STAR 05 02.
N67-11993 HC$3.00 MF$0.65

RESULTS OF OBSERVATIONS OF ARTIFICIAL EARTH SATELLITES, NO. 74.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
1964, 63p
In Russian

Descriptors: *Geocentric coordinate, *Satellite observation, *U.S.S.R. space program, Coordinate, Cosmos ii satellite, Cosmos xvii satellite, Cosmos satellite, Equator, Geocentric, Horizontal, Observation, Satellite, Sputnik satellite.

For abstract, see STAR 05 02.
N67-11994 HC$3.00 MF$0.65

ADVANCED PLANETARY PROBE STUDY. VOLUME 2 - SPIN-STABILIZED SPACECRAFT FOR THE BASIC MISSION FINAL TECHNICAL REPORT.
Trw Systems, Redondo Beach, Calif.
27 Jul 66, 567p NASA-CR-79502, TRW-4547-6005-RO000
Contracts NAS7-100, JPL-951311
Prepared For Jpl

Descriptors: *Flyby mission, *Jupiter project, *Planetary spacecraft, *Spin stabilization, Atlas launch vehicle, Centaur launch vehicle, Cost, Design, Effect, Effectiveness, Flyby, Functional, Mission, Payload, Planetary, Probe, Propellant, Reliability, Requirement, Science, Solid, Spacecraft, Spin, Stabilization, Stage, Subsystem, System, Third.

For abstract, see STAR 05 02.
N67-12045 HC$3.00 MF$0.65

ADVANCED PLANETARY PROBE STUDY. VOLUME 3 - ALTERNATE SPACECRAFT AND MISSIONS FINAL TECHNICAL REPORT.
Trw Systems, Redondo Beach, Calif.
27 Jul 66, 263p NASA-CR-79501, TRW-4547-6006-RO000
Contracts NAS7-100, JPL-951311
Prepared For Jpl

Descriptors: *Flyby mission, *Jupiter project, *Planetary spacecraft, *Spacecraft configuration, Axis, Capsule, Configuration, Cost, Design, Effectiveness, Entry, Flyby, Mission, Orbit, Payload, Planetary, Reliability, Science, Spacecraft, Stabilization, System.

For abstract, see STAR 05 02.
N67-12046 HC$3.00 MF$0.65

STUDY OF EXPANDABLE, TERMINAL DECELERATORS FOR MARS ATMOSPHERIC ENTRY. VOLUME II - SUPPORTING DATA AND TECHNICAL ANALYSIS.
Goodyear Aerospace Corp., Akron, Ohio. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
J. L. Musil. 3 Oct 66, 286p NASA-CR-79496, GER-12842, VOL. II
Contracts NAS7-100, JPL-951153
Prepared For Jpl

Descriptors: *Aerodynamic characteristics, *Decelerator, *Mars atmosphere, *Planetary landing, Aerodynamic, Atmosphere, Characteristics, Computer, Entry, Environment, Expansion, Fabric, Flight, Landing, Mars, Planetary, Program, Terminal, Weight.

For abstract, see STAR 05 02.
N67-12052 HC$3.00 MF$0.65

SPACE PROGRAMS SUMMARY NO. 37-40, VOLUME IV FOR THE PERIOD JUNE 1, 1966 TO JULY 31, 1966. SUPPORTING RESEARCH AND ADVANCED DEVELOPMENT.
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
31 Aug 66, 236p NASA-CR-79917, JPL-SPS-37-40, VOL. IV
Contract NAS7-100

Descriptors: *Engineering development, *Environment simulation, *Guidance and control, *Propulsion system, *Space program, *Telecommunication, Control, Development, Engineering, Environment, Guidance, Mechanics, Nasa program, Program, Propulsion, Research, Science, Simulation, Space, Summary, System.

For abstract, see STAR 05 02.
N67-12101 HC$3.00 MF$0.65

STUDY OF EXPANDABLE, TERMINAL DECELERATORS FOR MARS ATMOSPHERE ENTRY INTERIM SUMMARY REPORT, DEC. 1965 - JUN. 1966.
Goodyear Aerospace Corp., Akron, Ohio. Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
J. L. Musil. 22 Jul 66, 38p NASA-CR-80127, GER-12691, REV. A
Contracts NAS7-100, JPL-951153
Prepared For Jpl

Descriptors: *Atmospheric entry, *Decelerator, *Mars spacecraft, Atmospheric, Capsule, Configuration, Design, Device, Entry, Environment, Expansion, Landing, Mars, Model, Spacecraft, Terminal, Trajectory.

For abstract, see STAR 05 02.
N67-12174 HC$3.00 MF$0.65

OPTICAL TECHNOLOGY APOLLO EXTENSION SYSTEM, PART I. EXECUTIVE SUMMARY REPORT.
Chrysler Corp., New Orleans, La. Space Div.
21 Oct 66, 32p NASA-CR-79522
Contract NAS8-20256

Descriptors: *Apollo project, *Experiment design, Aerospace, Astronomy, Design, Evaluation, Experiment, Extension, Meteorology, Optics, Planetographic, Project, Recommendation, Sun, System, Technology.

For abstract, see STAR 05 02.
N67-12217 HC$3.00 MF$0.65

22C. SPACECRAFT TRAJECTORIES AND REENTRY

SPAD FORMATTER: THE BUFFER INTERFACE BETWEEN THE SATELLITE PREDICTION COMPUTER AND THE DISPLAY.
Interim rept.,
Naval Research Lab., Washington, D. C.
R. J. Orsino, and J. R. Boller. 11 Oct 66, 33p
NRL-6431

Descriptors: (*Satellites (Artificial), Position finding), (*Space surveillance systems, Display systems), (*Orbital trajectories, Mathematical prediction), Digital computers, Computer storage devices, Input-output devices, Magnetic core storage, Design.
Identifiers: SPAD.

The computer generates information for as many as 11 satellites each 1.1 seconds. The formatter accepts these computer output words as they are generated and, through appropriate gating and timing sequences, presents the data to the display at a rate of 30 frames per second. The formatter also contains a magnetic core memory device which permanently retains map grid symbol information and provides temporary storage for points representing a suborbital path. As an experimental device, the formatter was built in a three-bay rack cabinet with room provided for possible expansion or modification of the design. To facilitate calibration and maintenance, a rack-mounted four-channel cathode-ray oscilloscope can be connected to a circuit drawer and desired test points selected by means of rotary switches. Other circuit features permit maintenance personnel to rapidly check the performance of computer and formatter and isolate any malfunction. The formatter performed as desired. The report discusses in general the design problems common to computer driven displays and considers specifically problems encountered in designing the SPAD formatter as well as the theory of operation of the overall equipment. Alternative approaches to the digital logic design problems are presented whenever possible, and the philosophy and reasons for the particular approaches chosen for SPAD are given. (Author)
AD-643 561 HC$3.00 MF$0.65

AN ASYMPTOTIC SOLUTION FOR OPTIMUM POWER LIMITED ORBIT TRANSFER.
Revised ed.,
United Aircraft Corp., East Hartford, Conn. Research Labs.
T. N. Edelbaum. 23 Mar 66, 6p
AFOSR-66-2268
Contract AF 49 (638)-1239
Revision of manuscript submitted 28 Oct 65.
Availability: Published in AIAA Journal v4 n8 p1491-4 Aug 1966.

Descriptors: (*Transfer trajectories, Optimization), Thrust, Elliptical orbit trajectories.

A first order asymptotic solution is obtained for minimum fuel transfer of a power-limited rocket between coplanar elliptic orbits in fixed time. The present analysis adds the periodic terms to the author's earlier determination of the secular terms. The optimal control is synthesized implicitly for the general case and explicitly for the coaxial case. (Author)
AD-643 613 Not available from CFSTI.

APPLICATION OF THE METHOD OF EQUALIZATION OF OBSERVATIONS FOR EVALUATING THE POSITIONS OF AN ARTIFICIAL SATELLITE OF THE EARTH.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
A. A. Kiselev. 18 Aug 66, 16p FTD-TT-65-2039
Unedited rough draft trans. of Byulleten' Stantsii Opticheskogo Nablyudenia Iskusstvennykh Sputnikov Zemli (USSR) n32 p16-24 1963.

Descriptors: (*Satellites (Artificial), Tracking), (*Orbital trajectories, Satellites (Artificial)), Satellite tracking systems, Numerical analysis, USSR, Celestial mechanics.

The objective evaluation of the precision of observations of artificial satellites of the earth is obtained ordinarily as a collateral product in the process of determining or improving the elements of the orbits of selected satellites. The respective computations are based on great series of observations carried out at different stations at different points of the earth's sphere over the course of an interval of time of the order of several weeks and in an extreme case, days. These series of observations can hardly be recognized as uniform. Lack of agreement in the data of observations and the theory under these conditions is reflected not only by actual, random, and systematic errors in the observations, but also by errors in the position of the stations of observations, imperfections in the theory, or real anomalies in the movement of the satellites, which can be especially notable in the case of low satellites.
AD-644 004 HC$3.00 MF$0.65

TARTU STATION FOR OBSERVING ARTIFICIAL EARTH SATELLITES,
Foreign Technology Div., Wright-Patterson AFB, Ohio.
M. K. Liigant. 14 Jul 66, 6p FTD-HT-66-321 TT-67-60301
Unedited rough draft trans. of Byulleten' Stantsii Opticheskogo Nablyudeniya Iskusstvennykh Sputnikov Zemli (USSR) n33 p26-9 1963.

Descriptors: (*Satellites (Artificial), Tracking), Astronomical observatories, USSR, Astronomical data, Computers.
Identifiers: Tartu station.

Film type DK. Negative measurements carried out on an UIM-21. Treatment was carried out by the Kiselev method. Calculations on the Ural computer carried out by A. Koryus and Kh. Khaki. Times given in standard time. Correction for radial apparatus. No correction was made for refraction.
AD-644 014 HC$3.00 MF$0.65

OBSERVATION OF ARTIFICIAL SATELLITES.
Foreign Technology Div., Wright-Patterson AFB, Ohio.
14 Jul 66, 9p FTD-HT-66-322
Unedited rough draft trans. of Byulleten' Stantsii Opticheskogo Nablyudeniya Iskusstvennykh Sputnikov Zemli (USSR) n32 p33-7 1963.

Descriptors: (*Satellites (Artificial), Tracking), Data, USSR.

Camera HAFA-3c/25, Pankhrome film, DK. Coordinate measurements were made with a UIM-21. Computations on the Ural computer. Time corrections for signal delay in the IP and PRV receiver were carried out.
AD-644 064 HC$3.00 MF$0.65

ON THE LONG-PERIOD MOTION IN THE SEMI-MAJOR AXIS OF THE ORBIT OF THE TELSTAR 2 SATELLITE.
National Aeronautics And Space Administration. Goddard Space Flight Center, Greenbelt, Md.
J. P. Murphy. Jun 66, 17p NASA-TM-X-55579, X-547-66-260

Descriptors: *Pressure, *Solar radiation, *Telstar ii satellite, Atmospheric, Axis, Drag, Ephemeris, Force, Gravitational, Motion, Orbit, Periodicity, Radiation, Shadow, Solar.

For abstract, see STAR 05 02.
N67-11361 HC$3.00 MF$0.65

ANALYSIS OF USE OF JUPITER GRAVITY TURNS FOR TAILORING TRAJECTORIES TO SATURN WITH CONSIDERATION OF LAUNCH OPPORTUNITIES.
National Aeronautics And Space Administration. Langley Research Center, Langley Station, Va.
E. F. Harrison, and C. H. Mc Lellan. Nov 66, 57p NASA-TN-D-3699

Descriptors: *Interplanetary trajectory, *Saturn (planet), *Trajectory control, Angle, Control, Coplanar, Flight, Gravity, Hyperbola, Interplanetary, Jupiter (planet), Launch, Path, Payload, Planet, Position, Saturn, Trajectory, Velocity.

For abstract, see STAR 05 02.
N67-11388 HC$3.00 MF$0.65

BULLETIN OF ORBITAL INFORMATION. PART I - ORBITAL PARAMETERS.
Bulletin De Reseignements Orbitaux. "la Premiere Partie - Parametres D'orbite"
National Aeronautics And Space Administration, Washington, D. C.
Oct 66, 8p NASA-TT-F-10468
Translated Into English From French

Descriptors: *Satellite orbit, *Trajectory analysis, Analysis, Ascent, Displacement, Drift, Eccentricity, Inclination, Information, Orbit, Parameter, Perigee, Satellite, Space vehicle, Trajectory.

For abstract, see STAR 05 02.
N67-11389 HC$3.00 MF$0.65

FAILURE ANALYSIS OF THE METHOD OF ADJOINT SYSTEMS TO DETERMINE OPTIMAL TRAJECTORIES.
Texas Univ., Austin. Engineering Mechanics Research Lab.
P. Salvato, Jr.. Aug 66, 127p NASA-CR-79509, EMRL-TR-1005
Grant NSG-551

Descriptors: *Boundary value problem, *Failure mode, *Systems analysis, *Trajectory optimization, Adjoint, Analysis, Boundary, Dynamic, Equation, Failure, Formulation, Matrix, Method, Mode, Optimization, Problem, System, X ajectory, Value.

For abstract, see STAR 05 02.
N67-11739 HC$3.00 MF$0.65

MULTIPLE PLANET FLYBY MISSIONS TO VENUS AND MARS IN 1975 TO 1980 TIME PERIOD.
National Aeronautics And Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A. C. Young. 6 Oct 66, 107p NASA-TM-X-53511

Descriptors: *Flyby mission, *Mars probe, *Venus probe, Comparison, Departure, Earth, Encounter, Flyby, Mission, Multiple, Period, Phase, Planet, Return, Single, Time.

For abstract, see STAR 05 02
N67-11823 HC$3.00 MF$0.65

BULLETIN OF STATIONS FOR OPTICAL SATELLITE TRACKING, NO. 44.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
1965, 29p
In Russian, English Summary

Descriptors: *Eccentricity, *Satellite orbit, *Table, Anomaly, Average, Optical, Orbit, Radius, Ratio, Satellite, Station, Tracking, Vector.

For abstract, see STAR 05 02.
N67-11912 HC$3.00 MF$0.65

BULLETIN OF STATIONS FOR OPTICAL SATELLITE TRACKING, NO. 45.
Academy Of Sciences (Ussr), Moscow. Astronomical Committee.
1965, 141p
In Russian

Descriptors: *Nasa program, *Satellite launching, *Sounding rocket, *Space vehicle, *U.S.S.R. space program, Characteristics, Configuration, Data, Launching, Mission, Orbit, Probe, Rocket, Satellite, Sounding, U.S.A..

For abstract, see STAR 05 02.
N67-11913 HC$3.00 MF$0.65

KINETHEODOLITE OBSERVATIONS OF SATELLITES RECEIVED BY THE SATELLITE ORBITS GROUP FROM MALTA FOR JUNE 1966.
Radio And Space Research Station, Slough (England).
1966, 39p
Its Issue No. 18

Descriptors: *Cinetheodolite, *Orbiting satellite, *Table, *Tracking station, Agena d rocket, Alouette satellite, Azimuth, Cosmos satellite, Courier satellite, Elektron satellite, Elevation, Explorer satellite, Orbit, Rocket, Satellite, Station, Time, Tiros satellite, Tracking, Transit ib satellite.

For abstract, see STAR 05 02.
N67-11914 HC$3.00 MF$0.65

NUMERICAL COMPUTATION OF SATELLITE ORBITS USING LIE SERIES. COMPARISON WITH OTHER METHODS.
Innsbruck Univ. (Austria). Computer Dept.
H. Knapp. Sep 66, 28p NASA-CR-79763, SR-10
Contract NGR-52-046-001

Descriptors: *Computation, *Lie group, *Satellite orbit, Body, Celestial, Error, Estimation, Integral, Mechanics, Numerical, Orbit, Perturbation, Problem, Satellite, Three, Two.

For abstract, see STAR 05 02.
N67-12077 HC$3.00 MF$0.65

MISSION LOGIC DEVELOPMENT AND TRAJECTORY PREDICTION, DETERMINATION AND OPTIMIZATION FINAL REPORT.
Analytical Mechanics Associates, Inc., Uniondale, N. Y.

Feb 65, 22p NASA-CR-65557
Contract NAS9-2527

Descriptors: *Discrete function, *Midcourse guidance, *Mission planning, *Trajectory optimization, Analysis, Calculation, Covariance, Discrete, Equation, Error, Function, Guidance, Logic, Matrix, Measurement, Midcourse, Mission, Optimization, Perturbation, Planning, Trajectory.

For abstract, see STAR 05 02.
N67-12092 HC$3.00 MF$0.65

SATELLITE ORBITAL DATA NO. E-5.
Smithsonian Astrophysical Observatory, Cambridge, Mass.
B. Miller. 30 Sep 66, 39p NASA-CR-80092, SAO SPECIAL REPT.-222
Grant NSG-87-60

Descriptors: *Orbital element, *Satellite observation, Echo i satellite, Element, Explorer ix satellite, Harmonics, Injun iii satellite, Midas iv satellite, Observation, Orbital, Perturaation, Satellite, Table, Telstar i satellite, Tesseral, Vanguard ii satellite.

For abstract, see STAR 05 02.
N67-12150 HC$3.00 MF$0.65

SEPARATION OF TWO BODIES IN SPACE. A MACHINE PROGRAMMED ANALYSIS USING THE LAGRANGE EQUATIONS AND EULERIAN ANGLES.
Jet Propulsion Lab., Calif. Inst. Of Tech., Pasadena.
R. G. Chamberlain, and T. H. Mack. 15 May 66, 152p NASA-CR-80115, JPL-TR-32-912
Contract NAS7-100

Descriptors: *Fortran, *Lagrange equation, *Two-body problem, Analysis, Body, Computer, Constraint, Equation, Firing, Force, Motion, Problem, Program, Rocket, Separation, Space, Spacecraft, Spring, Two.

For abstract, see STAR 05 02.
N67-12257 HC$3.00 MF$0.65

22D. SPACECRAFT LAUNCH VEHICLES AND GROUND SUPPORT

COMPILATION OF FLIGHT DATA FROM TITAN III VEHICLES.
Martin Co., Denver, Colo.
J. Newgent. Dec 66, 412p NASA-CR-66204
Contract NAS1-6483

Descriptors: *Acoustic vibration, *Titan iii launch vehicle, Acoustic, Launch, Recording, Reduction, Shock, Surface, System, Telemetry, Trajectory, Vibration, Weight.
For abstract, see STAR 05 02.
N67-11321 HC$3.00 MF$0.65

*U. S. GOVERNMENT PRINTING OFFICE : 1967 252-091/15

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60 AD-296 330
18C AD-404 861
20J AD-423 664
17I AD-446 811
17I AD-469 185
9C AD-470 397
5J AD-471 806
20F AD-472 767
20I AD-479 919
11C AD-482 760
20K AD-484 524
11F AD-489 213
11D AD-489 216
12A AD-643 446
20F AD-643 447
7B AD-643 448
7D AD-643 449
20B AD-643 450
20J AD-643 451
20B AD-643 452
12A AD-643 453
3B AD-643 454
3B AD-643 456
9E AD-643 457
12A AD-643 458
9E AD-643 459
4B AD-643 460
20N AD-643 461
6S AD-643 462
14E AD-643 463
20C AD-643 464
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8L AD-643 468
7D AD-643 469
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7D AD-643 471
5A AD-643 472
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20D AD-643 479
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22C AD-643 561
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13I AD-643 573
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20K AD-643 577
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8B AD-643 579
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7C AD-643 5A1
3B AD-643 5A2
7D AD-643 5A3
5J AD-643 5A4
8J AD-643 5A5
20M AD-643 5A6
3B AD-643 5A7
8G AD-643 5A8
7D AD-643 5A9
6C AD-643 5B0
5J AD-643 5B1
18H AD-643 5B2
17B AD-643 5B3
1C AD-643 5B4
12A AD-643 5B5
10B AD-643 5B6
19A AD-643 5B7
20K AD-643 5B8
7D AD-643 5B9
20C AD-643 5C0
18D AD-643 5C1
5J AD-643 5C2
5J AD-643 5C3
6A AD-643 5C4
6A AD-643 5C5
20E AD-643 5C6
9E AD-643 5C7
6C AD-643 5C8
6C AD-643 5C9
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8G AD-643 619
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13H AD-643 623
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11F AD-643 626
13H AD-643 627
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13H AD-643 629
5B AD-643 630
9E AD-643 631
20D AD-643 632
20J AD-643 633
8K AD-643 634
6C AD-643 635
4A AD-643 636
20L AD-643 638
8G AD-643 639
20L AD-643 640
4B AD-643 641
20K AD-643 642
20D AD-643 643
20D AD-643 644
7D AD-643 645
5D AD-643 646
15C AD-643 647
15C AD-643 648
3B AD-643 649
8J AD-643 650
6R AD-643 651
20L AD-643 652
6M AD-643 653
15B AD-643 654
13J AD-643 655
5I AD-643 656
20I AD-643 657
12A AD-643 658
9D AD-643 659
20C AD-643 660
7D AD-643 661
20I AD-643 662
13E AD-643 663
13E AD-643 664
13E AD-643 665
13E AD-643 666
13E AD-643 667
13E AD-643 668
19D AD-643 669
21B AD-643 670
3B AD-643 671
8E AD-643 672
6M AD-643 673
6M AD-643 674
6O AD-643 675
11F AD-643 676
11F AD-643 677
7D AD-643 678
5J AD-643 679
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5J AD-643 681
12A AD-643 682
20D AD-643 683
4B AD-643 684
11F AD-643 685
5I AD-643 686
6L AD-643 687
11F AD-643 688
4B AD-643 689
6C AD-643 690
9E AD-643 691
5C AD-643 692
6E AD-643 693
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6E AD-643 695
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20K AD-643 697
14B AD-643 698
20I AD-643 699
14B AD-643 700
9B AD-643 701
9B AD-643 702
1C AD-643 703
1C AD-643 704
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6P AD-643 706
5J AD-643 707
7C AD-643 708
6D AD-643 709
20F AD-643 710
9D AD-643 711
17I AD-643 712
9E AD-643 713
12A AD-643 714
20L AD-643 715

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20F AD-643 718	12A AD-643 789	20K AD-643 881
15C AD-643 719	5I AD-643 800	6S AD-643 882
14B AD-643 720	14E AD-643 801	6E AD-643 883
6C AD-643 721	7B AD-643 802	7E AD-643 884
8A AD-643 722	7D AD-643 803	20H AD-643 885
6A AD-643 723	12B AD-643 804	6S AD-643 886
12A AD-643 724	7D AD-643 805	6S AD-643 887
5J AD-643 725	6R AD-643 806	20J AD-643 888
11F AD-643 726	6R AD-643 807	6H AD-643 889
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17I AD-643 730	20H AD-643 811	17I AD-643 893
13H AD-643 731	20H AD-643 812	17G AD-643 894
9E AD-643 732	11I AD-643 813	20D AD-643 895
11D AD-643 733	3B AD-643 814	14E AD-643 896
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20L AD-643 735	12A AD-643 816	7C AD-643 898
6K AD-643 736	12B AD-643 817	11E AD-643 899
11B AD-643 737	12B AD-643 818	7D AD-643 900
20D AD-643 738	6M AD-643 819	20I AD-643 901
19A AD-643 739	5J AD-643 820	14B AD-643 902
12B AD-643 740	9B AD-643 821	20H AD-643 903
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4A AD-643 742	14B AD-643 823	5C AD-643 905
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10C AD-643 750	10B AD-643 831	6C AD-643 913
14B AD-643 751	10B AD-643 832	3B AD-643 914
20A AD-643 752	20H AD-643 833	6A AD-643 915
11G AD-643 753	20L AD-643 834	7D AD-643 916
18F AD-643 754	20D AD-643 835	20J AD-643 917
11F AD-643 755	3B AD-643 836	4A AD-643 918
14B AD-643 756	20H AD-643 837	9B AD-643 919
15E AD-643 757	6A AD-643 838	13H AD-643 920
6R AD-643 758	20J AD-643 839	1C AD-643 921
6P AD-643 759	20H AD-643 841	9E AD-643 922
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5E AD-643 761	5I AD-643 843	11B AD-643 924
6P AD-643 762	5I AD-643 844	20B AD-643 925
5C AD-643 763	5A AD-643 845	9B AD-643 926
20B AD-643 764	13J AD-643 846	9E AD-643 927
13C AD-643 765	7D AD-643 847	13M AD-643 928
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20I AD-643 769	17G AD-643 851	20I AD-643 932
14B AD-643 770	12A AD-643 852	7B AD-643 933
21G AD-643 771	13J AD-643 853	17G AD-643 934
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		20E AD-643 960

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17I AD-643 974	20F AD-644 00E	17I AD-644 0AE
3A AD-643 975	20F AD-644 00F	3A AD-644 0AF
12A AD-643 976	20F AD-644 00G	12A AD-644 0AG
9B AD-643 977	20F AD-644 00H	9B AD-644 0AH
9A AD-643 978	20F AD-644 00I	9A AD-644 0AI
6D AD-643 979	20F AD-644 00J	6D AD-644 0AJ
5B AD-643 980	20F AD-644 00K	5B AD-644 0AK
20H AD-643 981	20F AD-644 00L	20H AD-644 0AL
7D AD-643 982	20F AD-644 00M	7D AD-644 0AM
6P AD-643 983	20F AD-644 00N	6P AD-644 0AN
6C AD-643 984	20F AD-644 00O	6C AD-644 0AO
6O AD-643 985	20F AD-644 00P	6O AD-644 0AP
5I AD-643 986	20F AD-644 00Q	5I AD-644 0AQ
6E AD-643 987	20F AD-644 00R	6E AD-644 0AR
17I AD-643 988	20F AD-644 00S	17I AD-644 0AS
5B AD-643 989	20F AD-644 00T	5B AD-644 0AT
5K AD-643 990	20F AD-644 00U	5K AD-644 0AU
11F AD-643 991	20F AD-644 00V	11F AD-644 0AV
6P AD-643 992	20F AD-644 00W	6P AD-644 0AW
5G AD-643 993	20F AD-644 00X	5G AD-644 0AX
7C AD-643 994	20F AD-644 00Y	7C AD-644 0AY
12B AD-643 995	20F AD-644 00Z	12B AD-644 0AZ
12A AD-643 996	20F AD-644 010	12A AD-644 0B0
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7B AD-644 002	20F AD-644 016	7B AD-644 0B6
6L AD-644 003	20F AD-644 017	6L AD-644 0B7
22C AD-644 004	20F AD-644 018	22C AD-644 0B8
20I AD-644 005	20F AD-644 019	20I AD-644 0B9
21B AD-644 006	20F AD-644 01A	21B AD-644 0BA
20F AD-644 007	20F AD-644 01B	20F AD-644 0BB
9E AD-644 008	20F AD-644 01C	9E AD-644 0BC
20F AD-644 009	20F AD-644 01D	20F AD-644 0BD
20F AD-644 010	20F AD-644 01E	20F AD-644 0BE
20L AD-644 011	20F AD-644 01F	20L AD-644 0BF
17B AD-644 012	20F AD-644 01G	17B AD-644 0BG
20M AD-644 013	20F AD-644 01H	20M AD-644 0BH
22C AD-644 014	20F AD-644 01I	22C AD-644 0BI
20G AD-644 015	20F AD-644 01J	20G AD-644 0BJ
14B AD-644 016	20F AD-644 01K	14B AD-644 0BK
12A AD-644 017	20F AD-644 01L	12A AD-644 0BL
1E AD-644 018	20F AD-644 01M	1E AD-644 0BM
20F AD-644 019	20F AD-644 01N	20F AD-644 0BN
8F AD-644 020	20F AD-644 01O	8F AD-644 0BO
11I AD-644 021	20F AD-644 01P	11I AD-644 0BP
4B AD-644 022	20F AD-644 01Q	4B AD-644 0BQ
20K AD-644 023	20F AD-644 01R	20K AD-644 0BR
18D AD-644 024	20F AD-644 01S	18D AD-644 0BS
6E AD-644 025	20F AD-644 01T	6E AD-644 0BT
20D AD-644 026	20F AD-644 01U	20D AD-644 0BU
6T AD-644 027	20F AD-644 01V	6T AD-644 0BV
20C AD-644 028	20F AD-644 01W	20C AD-644 0BW
14B AD-644 029	20F AD-644 01X	14B AD-644 0BX
20I AD-644 030	20F AD-644 01Y	20I AD-644 0BY
3B AD-644 031	20F AD-644 01Z	3B AD-644 0BZ
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12A AD-644 040	20F AD-644 028	12A AD-644 0C8

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7E AD-644 044
14B AD-644 045
20D AD-644 046
20E AD-644 047
11G AD-644 048
12A AD-644 049
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18H AD-644 051
21E AD-644 052
9B AD-644 053
5I AD-644 054
20J AD-644 055
7D AD-644 056
7D AD-644 057
7B AD-644 058
7B AD-644 059
6A AD-644 060
3B AD-644 061
20N AD-644 062
4A AD-644 063
22C AD-644 064
14E AD-644 065
20M AD-644 066
3B AD-644 067
1B AD-644 068
9E AD-644 069
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7D AD-644 081
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7B AD-644 083
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7C AD-644 085
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3A AD-644 088
20J AD-644 089
6O AD-644 090
20J AD-644 091
20J AD-644 092
20L AD-644 093
12A AD-644 094
8G AD-644 095
15C AD-644 096
20L AD-644 097
20B AD-644 098
20B AD-644 099
18F AD-644 100
18F AD-644 101
18F AD-644 102
18F AD-644 103
18F AD-644 104
20F AD-644 105
12B AD-644 106
9E AD-644 107
9C AD-644 108
21D AD-644 109
9B AD-644 110
4B AD-644 111
11J AD-644 112
5D AD-644 113
5D AD-644 114
6S AD-644 115
6R AD-644 116
6R AD-644 117
6Q AD-644 118
1B AD-644 119
12A AD-644 120
12A AD-644 121

7D AD-644 123
7E AD-644 124
7B AD-644 125
7B AD-644 126
7B AD-644 127
8D AD-644 128
20D AD-644 129
7D AD-644 130
6C AD-644 131
5J AD-644 132
20L AD-644 133
20J AD-644 134
20J AD-644 135
20J AD-644 136
6O AD-644 137
6N AD-644 138
7D AD-644 139
7D AD-644 140
1B AD-644 141
6M AD-644 142
1B AD-644 143
17I AD-644 144
1C AD-644 145
13E AD-644 146
13J AD-644 147
20D AD-644 148
9A AD-644 149
11B AD-644 150
4A AD-644 151
5C AD-644 152
21B AD-644 153
6L AD-644 154
6N AD-644 155
6A AD-644 156
6E AD-644 157
9E AD-644 158
12A AD-644 159
3B AD-644 160
12A AD-644 161
20D AD-644 162
13D AD-644 163
13K AD-644 164
9E AD-644 165
11F AD-644 166
20D AD-644 167
4B AD-644-122
14B AD-66 027
18A AEC-TR-6674
18I ANL-6621
20K ANL-7145
20H ANL-7173
12A ANL-7216
18D ANL-7226
20B ANL-7237
18J BMI-1782
6R BNL-981
18I BNWL-284
9B BNWL-299
7E DP-1033
18D DP-1035
18I DP-1054
6R HASL-177
6R HASL-178
6R HASL-179
18A LA-3500
20H LA-3538-VOL-1
20H LA-3538-VOL-2
18J LA-3557
6C LF-29
18J MCW-1448
18D MLM-1339
5R N67-11241
9B N67-11242
5B N67-11243
11F N67-11244
22B N67-11281
22D N67-11321
14B N67-11322
20M N67-11324
8G N67-11325
10A N67-11326

13H N67-11327
22B N67-11328
20D N67-11329
11F N67-11330
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10B N67-11332
13G N67-11333
21H N67-11334
21B N67-11335
21H N67-11336
18I N67-11337
13G N67-11338
5A N67-11339
22B N67-11340
20F N67-11341
6K N67-11342
9B N67-11343
9B N67-11344
1A N67-11345
11I N67-11346
22B N67-11347
13H N67-11348
13I N67-11350
7C N67-11351
12A N67-11352
20H N67-11353
1A N67-11354
1A N67-11355
20H N67-11356
22A N67-11357
20I N67-11358
20H N67-11359
20F N67-11360
22C N67-11361
9F N67-11362
4A N67-11363
4A N67-11364
4B N67-11365
20F N67-11366
20H N67-11367
22B N67-11368
4A N67-11369
9C N67-11370
20H N67-11371
22A N67-11372
9E N67-11373
4A N67-11374
8E N67-11375
20H N67-11376
18N N67-11377
4A N67-11378
4A N67-11379
20E N67-11380
22B N67-11381
22C N67-11382
22C N67-11383
6S N67-11391
3C N67-11392
10C N67-11393
3A N67-11394
22B N67-11395
20D N67-11396
22B N67-11397
22B N67-11398
5G N67-11399
6A N67-11400
17B N67-11681
9C N67-11682
13M N67-11683
13M N67-11684
20K N67-11685
20K N67-11686
13I N67-11687
20H N67-11688
12A N67-11689
9F N67-11690
9F N67-11691
20K N67-11692
6B N67-11693
6S N67-11694
5I N67-11695

4A N67-11696
20H N67-11697
20I N67-11698
20M N67-11699
9F N67-11700
22B N67-11721
10 N67-11722
20F N67-11723
4A N67-11724
7C N67-11725
4A N67-11726
9C N67-11727
9C N67-11728
1C N67-11729
20K N67-11730
17D N67-11731
10A N67-11732
22A N67-11733
22B N67-11734
21B N67-11735
20D N67-11736
11F N67-11737
20E N67-11738
22C N67-11739
6M N67-11740
1C N67-11758
18I N67-11759
18J N67-11760
20G N67-11761
11F N67-11800
22A N67-11810
20L N67-11811
1A N67-11812
21B N67-11813
13I N67-11814
1A N67-11815
20L N67-11816
4B N67-11817
14E N67-11818
14E N67-11819
18E N67-11820
20D N67-11821
6B N67-11822
6K N67-11823
22C N67-11824
13H N67-11841
5C N67-11842
20L N67-11843
20L N67-11844
6M N67-11845
6S N67-11846
14B N67-11847
5I N67-11848
5I N67-11850
5I N67-11851
6A N67-11852
17I N67-11853
3A N67-11854
17I N67-11855
9A N67-11856
4A N67-11857
9D N67-11858
6S N67-11859
9D N67-11860
20D N67-11860
4A N67-11870
18H N67-11873
20D N67-11906
18L N67-11912
22C N67-11913
22C N67-11914
22C N67-11917
20D N67-11943
5A N67-11944
13H N67-11945
10B N67-11946
6P N67-11947
8M N67-11948
20K N67-11949
20L N67-11950
20K N67-11951

3A N67-11951
20I N67-11952
21H N67-11953
20I N67-11954
20K N67-11955
22A N67-11956
20D N67-11957
20D N67-11958
14A N67-11959
14A N67-11960
22A N67-11961
13H N67-11963
5J N67-11965
20H N67-11966
9A N67-11967
6S N67-11968
20D N67-11970
7D N67-11982
7C N67-11983
4A N67-11984
6A N67-11985
11I N67-11986
22A N67-11990
22B N67-11992
22B N67-11993
22A N67-11994
20D N67-11995
11G N67-11996
17G N67-12032

20I N67-12041
20N N67-12042
10B N67-12043
22A N67-12044
22A N67-12045
22B N67-12046
9F N67-12047
20K N67-12048
20K N67-12049
17G N67-12050
20K N67-12051
22A N67-12052
17H N67-12053
17H N67-12054
17H N67-12055
17H N67-12056
17H N67-12057
17H N67-12058
20K N67-12059
20K N67-12060
5A N67-12062
20I N67-12063
22A N67-12064
9B N67-12066
5J N67-12067
20F N67-12068

3A N67-12069
13H N67-12070
3A N67-12071
11F N67-12072
6C N67-12073
7D N67-12074
12A N67-12075
12A N67-12076
22C N67-12077
20I N67-12078
13G N67-12079
6D N67-12080

9C N67-12082
20K N67-12083
22C N67-12092
14B N67-12093
20H N67-12094
13I N67-12095
1A N67-12096
20K N67-12097
17G N67-12098
14A N67-12099
22B N67-12101
22C N67-12150
9F N67-12151
3A N67-12153
22A N67-12154
9B N67-12155
12A N67-12156
5C N67-12157
21B N67-12158
9F N67-12159
9A N67-12160
9A N67-12161
14C N67-12162
7D N67-12163
20L N67-12164
3A N67-12165
20L N67-12166
9A N67-12167
20H N67-12168
10B N67-12169
12A N67-12170
20N N67-12171
3A N67-12172
20L N67-12173
22B N67-12174
10C N67-12175
7C N67-12176
5H N67-12177
20H N67-12178
20H N67-12179
3A N67-12180
6S N67-12201
20H N67-12203

3B N67-12204
3B N67-12205
20H N67-12206
22A N67-12207
20H N67-12208
6C N67-12209
14E N67-12210
14E N67-12211
20I N67-12212
7D N67-12213
7E N67-12214
10B N67-12215
18D N67-12216
22A N67-12217
14B N67-12218
20H N67-12219
20D N67-12220
5I N67-12221
7C N67-12222
20I N67-12223
22A N67-12224
6C N67-12225
4A N67-12226

20K N67-12227
20L N67-12228
11J N67-12229
9A N67-12230
13H N67-12231
20H N67-12232
5H N67-12233
4B N67-12234
3A N67-12235
20K N67-12236
6P N67-12237
20H N67-12238
22A N67-12239
9C N67-12240
20H N67-12241
20H N67-12242
20N N67-12243
10C N67-12244
20D N67-12245
22A N67-12246
3B N67-12247
3B N67-12248
20D N67-12249
6M N67-12250
3A N67-12251
3C N67-12252
9C N67-12253
12A N67-12254
6F N67-12255
6A N67-12256
22C N67-12257
9A N67-12258

5K N67-12259
20E N67-12260
7C N67-12261
20H N67-12262
20K N67-12263
5A N67-12264
11J N67-12265
11J N67-12266
11J N67-12267
8G N67-12268
7C N67-12269
9D N67-12270
3A N67-12271
5F N67-12272
11F N67-12273
4B N67-12274
20L N67-12275
11J N67-12276
9F N67-12277
9C N67-12278
13H N67-12279
13K N67-12280
5A ORNL-RSIC-15
20B ORNL-3794
20H ORNL-3856
18D ORNL-3893
18I ORNL-3945
18H ORNL-3973 VOL 1
18D ORNL-3973 VOL 2
18B ORNL-4013
11C PB-173 626
13F PB-173 665
13F PB-173 666
6P PB-173 669
6O PB-173 671
7A PB-173 673
5B PB-173 682
4B PB-173 683
5G PB-173 687
9B PB-173 688
5B PB-173 689
6N PB-173 690
6N PB-173 691
6R RFP-A11
20I SC-RR-66-357
20G SC-RR-66-506
20H SLAC-66
20H UCRL-11680-REV.
20I UCRL-14914
6R UCRL-14992
18D UCRL-16718
20G UCRL-16889
20H UCRL-2426
11F UCRL-50116
7C Y-1562
7D Y-1556

INDEXES

For Subject, Personal Author, Corporate Author, Contract Number, and Accession-Report Number Indexes to the documents listed in this journal, see Government-Wide Index (67-3), Feb. 10, 1967.

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